

COURSE:
GRADE LEVEL:

Math
Kindergarten

PI NUMBER	STRAND	MAJOR UNDERSTANDING <u>ESSENTIAL QUESTION</u>	<u>BAND/TOPIC</u> <u>VOCABULARY</u>	SKILLS/PERFORMANCE INDICATORS	SUGGESTIONS & ACTIVITIES	ASSESSMENTS
K.CC	Counting and Cardinality	Know number names and the count sequence <ul style="list-style-type: none"> • What are the number names and what does it mean to count in sequence? 	Sequence count	<ul style="list-style-type: none"> • Count 1-100, by 1's and by 10's • Count forward beginning from a given number within the know sequence • Write numbers from 0-20 • Represent a number of objects with a written numeral 0-20 	<ul style="list-style-type: none"> • Use 100's chart to count from 1-100 • <i>What Comes Next?</i> counting game • Count and write objects 0-20 • Center Activities 	<ul style="list-style-type: none"> • End of Chapter Test • Teacher observation • Completed center work
		<ul style="list-style-type: none"> • Count to tell the number of objects • Why do we learn to count? • What do numbers mean? • What does a number tell us? • How do I show (represent) how many? • How do I write numbers? 	<ul style="list-style-type: none"> • Number names • Greater than/more than • Less than/fewer than • Equal 	<ul style="list-style-type: none"> • Understand the relationship between numbers and quantities; connect counting to cardinality • When counting objects say the number names in the standard order, pairing each object with one and only one number name, and each number name with one and only one object • Understand that the last number name said tells the number of objects counted. The number of objects is the same regardless of the arrangement or the order of which they were counted. • Understand that each successive number name refers to a quantity that is larger than one. 	<ul style="list-style-type: none"> • Model 1 to 1 correspondence • Calendar activities • counting sets 1 to 5: apples, leaves • Numeral information 1 to 5 • Model 1 to 1 correspondence • Numeral identification 1 to 5 • One-to-one 1 to 5 • Numerical recognition: 0 to 5 • Numeral songs – how to form numbers • Sensory materials to numerical formation (play dough, sand, shaving cream) • Graphs • Count out loud using manipulatives • Voting with 2 choices 	<ul style="list-style-type: none"> • Class participation • Teacher observation • Learning Centers • Unit/chapter Tests

				<ul style="list-style-type: none"> • Develop understanding of ordinal numbers (first through tenth), to describe the relative position and magnitude of whole numbers. • Count to answer “how many?” question about as many as 20 things arranged in a line, a rectangular array, or a circle, or as many as 10 things in a scattered configuration; given a number from 1-20, count out that many objects. • Identify whether the number of objects in one group is greater than, less than, or equal to the number of objects in another group by using matching and counting strategies. • Compare 2 numbers between 1 & 10 presented as written numerals. 	<ul style="list-style-type: none"> • Tracing numbers • Counting; 0 to 10 • Counting concrete objects; children, calendar • Building sets 	
K.OA	Operations and Algebraic thinking	<p>Understand addition as putting together and adding to, and understand subtraction as taking apart and taking from</p> <ul style="list-style-type: none"> • What is addition? • How do we add? • What is subtraction? • How do we subtract? 	<p>Addition</p> <ul style="list-style-type: none"> • In all • Number sentence • How many • All together • Add • Sum • Is equal to • Plus one more numeral <p>Subtraction</p> <ul style="list-style-type: none"> • Subtract • Take away • Are left • One less 	<ul style="list-style-type: none"> • Represent addition and subtraction with objects, fingers, mental images, and drawings, sounds, acting out situations, verbal explanations, expressions, or equations. • Solve addition and subtraction word problems, and add and subtract with ten by using objects or drawings to represent the problem • Decompose numbers 	<ul style="list-style-type: none"> • Addition/Subtraction • Model 1-1 correspond (finger count) and calendar activities, counting sets 1-10, counting concrete objects, building sets, representing number with concrete manipulatives, number games, word stories, hand games/activities (which hand has more) 	<ul style="list-style-type: none"> • School level testing • Teacher Observation • Class participation • Teacher model activities/tests

			<ul style="list-style-type: none"> • Minus • Number sentence • Difference Patterning <ul style="list-style-type: none"> • Size • Color • Shape • Match Attributes <ul style="list-style-type: none"> • AB • AAB • ABB • ABC • AABB 	less than or equal to ten into pairs in more than one way, by using objects or drawings and record each decomposition by drawing or equation <ul style="list-style-type: none"> • For any number 1-9, find the number that makes 10 when added to the given number, by using objects or drawings, and record the answer with a drawing or equation • Fluently add and subtract within 5 	<ul style="list-style-type: none"> • Add numbers to sets • Concrete manipulatives • White boards • Smartboard lessons • Worksheets • Manipulatives • Number line • Role play/drama Patterning <ul style="list-style-type: none"> • Calendar, concrete objects (of varied size, color, shape), paper/pencil/crayons, Smartboard, center activities, recognizing attributes and apply correspondence, left is (i.e. AB,ABC, etc.), record properties, extend properties, copy properties 	
K.NBT	Number & Operations in base ten	<ul style="list-style-type: none"> • Work with numbers 11-19 to gain foundations for place value • How can I show numbers beyond 10? • How can I show numbers in various ways? 	<ul style="list-style-type: none"> • Ten frame • Ones • Tens 	<ul style="list-style-type: none"> • Compose and decompose numbers from 11-19 into 10 ones and some further ones, by using objects or drawings, and record each composition or decomposition by drawing or equation, understand that these numbers are composed of ten ones and one, two, three, four, five, six, seven, eight, or nine ones • Represent base ten using ten frames and counters 	<ul style="list-style-type: none"> • Draw pictures or other informal symbols to represent a spoken number up to 20 • Using counters show a number between 0 and 20 that has been told to them • Draw a picture displaying objects • Use a variety of strategies to compose and decompose two-digit numbers • Use base ten frames and counters to represent numbers 11-10 	<ul style="list-style-type: none"> • Class participation • Teacher observation • Learning Centers • Unit/Chapter tests
KMD	Measurement	Describe and compare	Attributes	<ul style="list-style-type: none"> • Describe measurable 	<ul style="list-style-type: none"> • Measure classroom 	<ul style="list-style-type: none"> • Chapter test

	and Data	<p>measurable attributes</p> <ul style="list-style-type: none"> • How do I know how long something is? • How do I know how short something is? • How do I know how much something weighs? • How do I know how light something is? • How can I estimate before measuring? • How can I compare two objects? 	<ul style="list-style-type: none"> • Shorter • Longer • Shortest • Longest • Measure • Estimate • Heavier • Lighter 	<p>attributes of objects, such as length and weight</p> <ul style="list-style-type: none"> • Describe several measurable attributes of a single object • Directly compare two objects with a measurable attribute in common, to see what object has “more of”/less of” the attribute, and describe the difference 	<p>items using non-standard units (yam, cubes, paperclips)</p> <ul style="list-style-type: none"> • Pick a classroom item to model vocabulary attributes • Students compare pencils or crayons to find “longer” and “shorter” 	<ul style="list-style-type: none"> • Teacher Observation
		<p>Classify objects and count the number of objects in each category</p> <ul style="list-style-type: none"> • How do I sort? • How do I know how many objects are in each category? 	<p>Comparing</p> <ul style="list-style-type: none"> • Estimate • Equal • Same as • More • More than • Fewer • One more • One less 	<ul style="list-style-type: none"> • Classify objects into given categories; count the numbers of objects in each category and sort the categories by count 	<ul style="list-style-type: none"> • Use weather graph to practice • Use manipulatives to sort, classify, count and compare (i.e. buttons, beads, tiles, cubes, students) 	<ul style="list-style-type: none"> • Chapter Test • Teacher Observation
K.G	Geometry	<p>Identify and describe shapes</p> <ul style="list-style-type: none"> • What are shapes? <p>Analyze, compare, create, and compare shapes</p> <ul style="list-style-type: none"> • How can I use shapes? 	<p>Attributes</p> <ul style="list-style-type: none"> • Above • Below • Beside • In front of • Behind • Next to • Circle • Square • Rectangle • Triangle • Hexagon • Cube • Sphere • Cone • Cylinder • Left • Right • Corners • Curves • Sides 	<ul style="list-style-type: none"> • Describe objects in the environment using names of shapes, and describe the relative positions of these objects using terms such as above, below, beside, in front of, behind, and next to • Correctly name shapes regardless of the orientations or overall size • Identify shapes as 2-dimensional or 3-dimensional • Analyze and compare two and three dimensional shapes, in different sizes and orientations using informal language to 	<ul style="list-style-type: none"> • Go on a shape hunt in classroom or building • Daily classroom directions • Lining up • Chants, songs, poems • Shape grab bag to identify each shape • Model and manipulate shapes and solids to differentiate • Experiment with stacking, sliding and rolling • Use geometric shapes to create models and pictures of objects in our environment 	<ul style="list-style-type: none"> • Chapter Test • Teacher observation

			<ul style="list-style-type: none">• Symmetry• Equal Parts• Over• Under• Top• Middle• Bottom• In• Out	<p>describe their similarities, differences, parts and other attributes</p> <ul style="list-style-type: none">• Model shapes in the world by building shapes from components and drawing shapes• Compose simple shapes to form larger shapes	<ul style="list-style-type: none">• Use attribute blocks to form shapes (i.e. join 2 triangles to make a rectangle)• Use corners, sides and curves to identify plane (flat) and solid shapes	
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COURSE: Math
GRADE LEVEL: 1

PI NUMBER	STRAND	MAJOR UNDERSTANDING ESSENTIAL QUESTION	BAND/TOPIC VOCABULARY	SKILLS/PERFORMANCE INDICATORS	SUGGESTIONS & ACTIVITIES	ASSESSMENTS
DOMAIN	CLUSTER NUMBER	STANDARDS ----- ESSENTIAL QUESTION	VOCABULARY	SKILLS	SUGGESTIONS & ACTIVITIES	ASSESSMENTS:
Instructional Shifts for Math: Focus, Coherence, Fluency, Deep Understanding, Application and Dual Intensity						
In Grade 1, instructional time should focus on four critical areas: (1) developing understanding of addition, subtraction, and strategies for addition and subtraction within 20; (2) developing understanding of whole number relationships and place value, including grouping in tens and ones; (3) developing understanding of linear measurement and measuring lengths as iterating length units; and (4) reasoning about attributes of, and composing and decomposing geometric shapes.						
OPERATIONS AND ALGEBRAIC THINKING 1.OA						
<ul style="list-style-type: none"> • Represent and solve problems involving addition and subtraction. • Understand and apply properties of operations and the relationship between addition and subtraction. • Add and subtract within 20. • Work with addition and subtraction equations. 						
1.OA	1.OA 1 1.OA 2	How do we represent and solve problems involving addition and subtraction? 1. Use addition and subtraction within 20 to solve word problems involving situations of adding to, taking from, putting together, taking apart, and comparing, with unknowns in all positions, e.g., by using objects, drawings, and equations with a symbol for the unknown number to represent the problem. ¹ 2. Solve word problems that call for addition of three	inside outside part whole add sum join subtract difference subtraction sentence minus sign equal sign take away compare	Spatial patterns for numbers to 10 Making 6, 7, 8, 9 Introduce addition expression and number sentences Use stories about joining Problem solving with objects Introduce subtracting expressions and number sentences Stories about taking away, comparing and missing parts. Problem solving acted	Topic 1,2, 4,5,6 Center games Topic 5 Grab and count Manipulatives Part, Part Whole Mat Shake and spill balance Dice games Unifix cubes Flashcards *numberline	envision Topic Tests Class participation Homework Teacher observation Benchmark tests

		whole numbers whose sum is less than or equal to 20, e.g., by using objects, drawings, and equations with a symbol for the unknown number to represent the problem.		out. Problem solving: Draw a picture and write a number sentence and Two question problems Word problems with 3 addends		
	<ul style="list-style-type: none"> 1.OA3 1.OA4 	<p>How do we understand and apply properties of operations and the relationship between addition and subtraction?</p> <p>3. Apply properties of operations as strategies to add and subtract.² <i>Examples: If $8 + 3 = 11$ is known, then $3 + 8 = 11$ is also known. (Commutative property of addition.) To add $2 + 6 + 4$, the second two numbers can be added to make a ten, so $2 + 6 + 4 = 2 + 10 = 12$. (Associative property of addition.)</i></p> <p>4. Understand subtraction as an unknown-addend problem. <i>For example, subtract $10 - 8$ by finding the number that makes 10 when added to 8. Add and subtract within 20.</i></p>	order addend missing part related facts fact families	<p>Add in any order Adding with 0,1,2 Adding 3 numbers</p> <p>Finding missing parts of 6, 7, 8 and 9, 10</p> <p>Use addition facts to 12 to relate to subtraction facts to 12.</p> <p>Use related facts fact families</p>	<p>Topic 1,4,5 Topic 2,3,4,6 Unifix cubes Turn around facts Numberline Center games</p>	<p>envision Topic Tests Class participation Homework Teacher observation Benchmark tests</p>
	<ul style="list-style-type: none"> 1.OA5 1.OA6 	<p>How do we add and subtract within 20?</p> <p>5. Relate counting to addition and subtraction (e.g., by counting on 2 to add 2).</p> <p>6. Add and subtract within 20, demonstrating fluency for addition and subtraction within 10. Use strategies such as counting on; making</p>	near double doubles plus 1 doubles plus 2 math facts	<p>Represent and recognize numbers on a ten frame Subtracting with 0,1,2 Lego game Connecting addition and subtraction Parts of ten Problem solving: Make a table</p>	<p>Topic 3,4 Topic 2,3,4,5,6 Doubles rap Flashcards numberline Center</p>	<p>envision Topic Tests Class participation Homework Teacher observation Benchmark tests</p>

		ten (e.g., $8 + 6 = 8 + 2 + 4 = 10 + 4 = 14$); decomposing a number leading to a ten (e.g., $13 - 4 = 13 - 3 - 1 = 10 - 1 = 9$); using the relationship between addition and subtraction (e.g., knowing that $8 + 4 = 12$, one knows $12 - 8 = 4$); and creating equivalent but easier or known sums (e.g., adding $6 + 7$ by creating the known equivalent $6 + 6 + 1 = 12 + 1 = 13$).		<p>Near doubles Facts with five on a ten frame Making ten on a ten frame Doubles Doubles plus 1 Doubles plus 2 Making ten to add (9 and 8) Making ten to subtract</p> <p>Add and subtract within 20 Demonstrate fluency for addition and subtraction within 10</p>	<p>games</p> <p>Ten Frame</p> <p>Doubles rap</p> <p>Mastering Math Facts</p>	
	<ul style="list-style-type: none"> 1.OA.7 1.OA.8 	<p>How do we work with addition and subtraction equations?</p> <p>7. Understand the meaning of the equal sign, and determine if equations involving addition and subtraction are true or false. For example, which of the following equations are true and which are false? $6 = 6$, $7 = 8 - 1$, $5 + 2 = 2 + 5$, $4 + 1 = 5 + 2$.</p> <p>8. Determine the unknown whole number in an addition or subtraction equation relating three whole numbers. <i>For example, determine the unknown number that makes the equation true in each of the equations $8 + ? = 11$, $5 = _ - 3$, $6 + 6 = _$.</i></p>		<p>Connecting models and symbols</p> <p>Subtraction facts to 20</p>	<p>Topic 1,2,4,5</p> <p>Topic 3,4,5,6</p> <p>Dice game</p> <p>Under the cup</p> <p>Center games</p>	<p>envision</p> <p>Topic Tests</p> <p>Class participation</p> <p>Homework</p> <p>Teacher observation</p> <p>Benchmark tests</p>

DOMAIN	CLUSTER NUMBER	STANDARDS ----- ESSENTIAL QUESTION	VOCABULARY	SKILLS	SUGGESTIONS & ACTIVITIES	ASSESSMENTS:
Number and Operations in Base Ten • Extend the counting sequence. • Understand place value. • Use place value understanding and properties of operations to add and subtract.						
1.NBT	1.NBT.1	How do we extend the counting sequence. 1. Count to 120, starting at any number less than 120. In this range, read and write numerals and represent a number of objects with a written numeral.	row column digit skip count	Using Numbers 11-19 Count on 100 Chart Using Skip /Counting Problem solving: Look for a pattern Make an organized list	Topic 7,9 chants, center games morning meeting	envision Topic Tests Participation Homework Teacher observation Benchmark tests
	1.NBT.2,3	How do we understand place value. 2. Understand that the two digits of a two-digit number represent amounts of tens and ones. Understand the following as special cases: a. 10 can be thought of as a bundle of ten ones — called a “ten.” b. The numbers from 11 to 19 are composed of a ten and one, two, three, four, five, six, seven, eight, or nine ones. c. The numbers 10, 20, 30, 40, 50, 60, 70, 80, 90 refer to one, two, three, four, five, six, seven, eight, or nine tens (and 0 ones). 3. Compare two two-digit numbers based on meanings of the tens and ones digits, recording the results of comparisons with the	tens ones break apart a ten one more one less ten more ten less equal to = less than greater than	Making Numbers 11-19 Counting by 1’s, 2’s, 5’s and 10’s to 120 Counting groups of 10’s or 1’s Expanded form 10’s and 1’s Identify various ways to make numbers Identify numbers made with 10’s Make an organized list Comparing Numbers with < > = Order 3 numbers	100’s chart Center games 2a = Topic 7,8 2b =Topic 7 Tens/Ones work mat 2c=Topic 7-8 3=Topic 9	envision Topic Tests Class participation Homework Teacher observation Benchmark tests

		symbols >, =, and <.				
	1.NBT.4 1.NBT 5 1.NBT 6	<p>How do we use place value understanding and properties of operations to add and subtract.</p> <p>4. Add within 100, including adding a two-digit number and a one-digit number, and adding a two-digit number and a multiple of 10, using concrete models or drawings and strategies based on place value, properties of operations, and/or the relationship between addition and subtraction; relate the strategy to a written method and explain the reasoning used. Understand that in adding two-digit numbers, one adds tens and tens, ones and ones; and sometimes it is necessary to compose a ten.</p> <p>5. Given a two-digit number, mentally find 10 more or 10 less than the number, without having to count; explain the reasoning used.</p> <p>6. Subtract multiples of 10 in the range 10-90 from multiples of 10 in the range 10-90 (positive or zero differences), using concrete models or drawings and strategies based on place value, properties of operations, and/or the relationship between addition and subtraction; relate the strategy to a written method and explain their reasoning.</p>	regroup	<p>Making numbers on a 100's chart</p> <p>Adding groups of 10</p> <p>Adding 10's on a hundreds chart</p> <p>Adding 10's to 2 digit numbers</p> <p>Using mental math to add tens</p> <p>Adding to a two-digit number</p> <p>Problem solving draw a picture and write a number sentence</p> <p>1 more, 1 less 10 more, 10 less</p> <p>Subtracting groups of 10</p> <p>Subtracting Tens on a Hundreds Chart</p> <p>Subtracting Tens from two-Digit Numbers</p> <p>Subtracting from a two digit number</p> <p>Problem Solving: Draw a picture and write a number sentence</p>	<p>4 =Topic 9,10</p> <p>Center games</p> <p>Tens/Ones work mat</p> <p>5= Topic 9,10, 11</p> <p>6= Topic 11</p>	<p>envision</p> <p>Topic Tests</p> <p>Class participation</p> <p>Homework</p> <p>Teacher observation</p> <p>Benchmark tests</p>

DOMAIN	CLUSTER NUMBER	STANDARDS ----- ESSENTIAL QUESTION	VOCABULARY	SKILLS	SUGGESTIONS & ACTIVITIES	ASSESSMENTS:
Measurement and Data • Measure lengths indirectly and by iterating length units. • Tell and write time. • Represent and interpret data.						
1.MD	1.MD 1,2	How do we measure lengths indirectly and by iterating length units. 1. Order three objects by length; compare the lengths of two objects indirectly by using a third object. 2. Express the length of an object as a whole number of length units, by laying multiple copies of a shorter object (the length unit) end to end; understand that the length measurement of an object is the number of same-size length units that span it with no gaps or overlaps. <i>Limit to contexts where the object being measured is spanned by a whole number of length units with no gaps or overlaps.</i>	longest shortest taller shorter estimate measure	Compare and order by length Indirect measurement Using units to estimate and measure length Use reasoning to problem solve Measure using different units	1 = Topic 12 Use manipulatives 2 = Topic 12 Literature Connection: <u>Inch by Inch</u> by Leo Leonni <u>How Big is a Foot</u> by Rolf Myer	envision Topic Tests Class participation Homework Teacher observation Benchmark tests
	1.MD 3	How do we tell and write time and identify coins names and values. 3. Tell and write time in hours and half-hours using analog and digital clocks.	hour hand hour minute hand minute o'clock half hour schedule	<i>Recognize and identify coins, their names, and their value.</i> <i>Understand the hours and minute hands</i> <i>Tell and write time to the hour</i> <i>Tell and write time to the half hour</i>	Topic 13 Judy clocks Penny, Penny poem	envision Topic Tests Class participation Homework Teacher observation Benchmark tests
	1.MD 4	Represent and interpret data. 4. Organize, represent, and interpret data with up to three categories; ask and answer questions about the total	picture graph bar graph data tally mark	<i>Use data from a table to problem solve</i> <i>Use data from real graphs, picture graphs and bar graphs.</i> <i>Collecting data using tally</i>	Topic 14 Glyphs morning meeting, weather unit Graphs	envision Topic Tests Class participation Homework Teacher

		number of data points, how many in each category, and how many more or less are in one category than in another.		<i>marks</i> <i>Making real graphs and picture graphs</i>	Scholastic News surveys	observation Benchmark tests
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DOMAIN	CLUSTER NUMBER	STANDARDS ----- ESSENTIAL QUESTION	VOCABULARY	SKILLS	SUGGESTIONS & ACTIVITIES	ASSESSMENTS:
Geometry						
• Reason with shapes and their attributes.						
1.G	1.G.1 1.G.2 1.G.3	Reason with shapes and their attributes. 1. Distinguish between defining attributes (e.g., triangles are closed and three-sided) versus non-defining attributes (e.g., color, orientation, overall size) ; build and draw shapes to possess defining attributes. 2. Compose two-dimensional shapes (rectangles, squares, trapezoids, triangles, half-circles, and quarter-circles) or three-dimensional shapes (cubes, right rectangular prisms, right circular cones, and right circular cylinders) to create a composite shape, and compose new shapes from the composite shape. ¹ 3. Partition circles and rectangles into two and four equal shares, describe the shares using the words <i>halves</i> , <i>fourths</i> , and <i>quarters</i> , and use the phrases <i>half of</i> , <i>fourth of</i> , and <i>quarter of</i> . Describe the whole as two of, or four of the shares. Understand for these examples that decomposing	plane shapes circle triangle rectangle square hexagon trapezoid sort side corner solid figure cube rectangular prism sphere cylinder cone flat surface vertex (vertices) pyramid equal parts halves fourths quarters half of fourth of quarter of two of four of	1.G.1 Identify Plane shapes Identify properties of plane shapes Identify solid figures Identify flat surfaces and vertices Sort solid figures Use reasoning to problem solve 1.G.2 Make an organized list to problem solve Build with shapes Make new shapes from shapes Build with solid figures 1.G.3 Make Equal parts Describe equal parts of whole objects Make halves and fourths of rectangles and circles Draw pictures to problem solve	1=Topic 15 2 = Topic 15 3=Topic 16 Pattern blocks Tangrams Geoboards 3-D shapes Environmental shapes Literature connection Shape hunt around room Literature connection: <u>Shapes</u> , <u>Shapes</u> book by Tana Hoban	envision Topic Tests Class participation Homework Teacher observation Benchmark tests

		into more equal shares creates smaller shares.				
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COURSE: Math
GRADE LEVEL: 2

PI NUMBER	STRAND	MAJOR UNDERSTANDING ----- ESSENTIAL QUESTION	BAND/TOPIC ----- VOCABULARY	SKILLS/PERFORMANCE INDICATORS	SUGGESTIONS & ACTIVITIES	ASSESSMENTS:
<p>The five process strands (problem solving, reasoning and proof, communication, connections, and representation) are integral to instruction. These strands, the major understandings and their associated performance indicators are to be incorporated into lessons throughout the school year on an ongoing basis.</p>						
<p>MONTH: SEPTEMBER - OCTOBER</p>						
2.N.6	Number Sense and Operations	Students will understand numbers, multiple ways of representing numbers, relationships among numbers, and number systems. ----- 1. How do we use numbers? 2. Why do we use numbers?	Number Systems ----- place value hundred chart 2-digit number label direction	<ul style="list-style-type: none"> Develop an understanding of the base ten system: 10 ones = 1 ten 10 tens = 1 hundred 10 hundreds = 1 thousand 	<ul style="list-style-type: none"> Use place value blocks and mats Practice regrouping ten and ones using place value models (e.g., 15 = 1 ten and 5 ones, 15 = 15 ones) 	<ul style="list-style-type: none"> Class participation Homework Teacher observation
2.N.12	Number Sense and Operations	Students will understand numbers, multiple ways of representing numbers, relationships among numbers, and number systems. ----- 1. How do we use numbers? 2. Why do we use numbers?	Number Systems ----- zero as the identity element of addition	<ul style="list-style-type: none"> Use zero as the identity element for addition 	<ul style="list-style-type: none"> Recognize the property of zero has no value using manipulatives 	<ul style="list-style-type: none"> Class participation Homework Teacher observation
2.N.13	Number Sense and Operations	Students will understand numbers, multiple ways of representing numbers, relationships among numbers, and number systems. -----	Number Systems ----- place value	<ul style="list-style-type: none"> Recognize the meaning of zero in the place value system (0-100) 	<ul style="list-style-type: none"> Use expanded notation to show zero holds the place Use a H-T-O chart to show multiples of 10(10,20, 30,)to 100 	<ul style="list-style-type: none"> Class participation Homework Teacher observation
2.N.7	Number Sense and	Students will understand numbers, multiple ways of	Number Systems -----	<ul style="list-style-type: none"> Use a variety of 	<ul style="list-style-type: none"> Practice writing two- 	<ul style="list-style-type: none"> Class participation

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<p>The five process strands (problem solving, reasoning and proof, communication, connections, and representation) are integral to instruction. These strands, the major understandings and their associated performance indicators are to be incorporated into lessons throughout the school year on an ongoing basis.</p>						
<p>MONTH: SEPTEMBER - OCTOBER</p>						
	Operations	representing numbers, relationships among numbers, and number systems. ----- 1. How do we use numbers? 2. Why do we use numbers? 3. How can numbers be grouped? 4. What are the place value for 2 and 3 digit numbers? 5. How do I use place value?	compose decompose representation	strategies to compose and decompose two-digit numbers Of\	digit numbers in expanded notation <ul style="list-style-type: none"> Practice regrouping in ten and ones using place value models (e.g., 15 = 1 ten and 5 ones, 15 = 15 ones) (e.g., 63 = 60 + 3 63 = 6 tens 3 ones) 	<ul style="list-style-type: none"> Homework Teacher observation
2.N.22	Number Sense	Students will compute accurately and make reasonable estimates ----- 1. How do we use numbers? 2. Why do we use numbers?	Estimation ----- estimate collection	<ul style="list-style-type: none"> Estimate the number in a collection to 100 and then compare by counting the actual items in the collection 	<ul style="list-style-type: none"> Estimate groups in a collection to 100, then sort into groups of 10 and count 	<ul style="list-style-type: none"> Numbers to 100 Chapter 1 Assessment
2.N.9	Number Sense and Operations	Students will understand numbers, multiple ways of representing numbers, relationships among numbers, and number systems. ----- 1. How do we order numbers?	Number Systems ----- before after in between	<ul style="list-style-type: none"> Name the number before and the number after a given number, and name the number(s) between two given numbers up to 100 (with and without the use of a number line or a hundreds chart) 	<ul style="list-style-type: none"> Initially use number line and hundreds chart Complete patterns to find missing numbers 	<ul style="list-style-type: none"> Class participation Homework Teacher observation

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<p>The five process strands (problem solving, reasoning and proof, communication, connections, and representation) are integral to instruction. These strands, the major understandings and their associated performance indicators are to be incorporated into lessons throughout the school year on an ongoing basis.</p>						
<p>MONTH: SEPTEMBER - OCTOBER</p>						
2.N.1	Number Sense and Operations	<p>Students will understand numbers, multiple ways of representing numbers, relationships among numbers, and number systems.</p> <p>-----</p> <ol style="list-style-type: none"> How do we use numbers? Why do we use numbers? 	<p>Number Systems</p> <p>-----</p> <p>skip count</p>	<ul style="list-style-type: none"> Skip count to 100 by 2'S, 5's, 10's 	<ul style="list-style-type: none"> Use a hundreds chart to practice skip counting Use nickels and dimes to practice counting 5s and 10s 	<ul style="list-style-type: none"> Class participation Homework Teacher observation
2.N.3	Number Sense and Operations	<p>Students will understand numbers, multiple ways of representing numbers, relationships among numbers, and number systems</p> <p>-----</p> <ol style="list-style-type: none"> How do we use numbers? Why do we use numbers? How are addition and multiplication related? 	<p>Number Systems</p> <p>-----</p> <p>multiplication repeated addition</p>	<ul style="list-style-type: none"> Skip count by 3's to 36 for multiplication readiness 	<ul style="list-style-type: none"> Create groups of 3 using manipulatives and count (e.g., 3 groups of 3 = 3 + 3 + 3 repeated addition) 	<ul style="list-style-type: none"> Class participation Homework Teacher observation
2.N.4	Number Sense and Operations	<p>Students will understand numbers, multiple ways of representing numbers, relationships among numbers, and number systems.</p> <p>-----</p> <ol style="list-style-type: none"> How do we use numbers? Why do we use numbers? How are addition and multiplication related? 	<p>Number Systems</p> <p>-----</p> <p>repeated addition</p>	<ul style="list-style-type: none"> Skip count by 4's to 48 for multiplication readiness 	<ul style="list-style-type: none"> Create groups of 4 using manipulatives and count (e.g., 2 groups of 4 = 4 + 4) 	<ul style="list-style-type: none"> Class participation Homework Teacher observation

PI NUMBER	STRAND	MAJOR UNDERSTANDING ----- ESSENTIAL QUESTION	BAND/TOPIC ----- VOCABULARY	SKILLS/PERFORMANCE INDICATORS	SUGGESTIONS & ACTIVITIES	ASSESSMENTS:
<p>The five process strands (problem solving, reasoning and proof, communication, connections, and representation) are integral to instruction. These strands, the major understandings and their associated performance indicators are to be incorporated into lessons throughout the school year on an ongoing basis.</p>						
<p>MONTH: SEPTEMBER - OCTOBER</p>						
2.N.14	Number Sense and Operations	<p>Students will understand numbers, multiple ways of representing numbers, relationships among numbers, and number systems.</p> <p>-----</p> <p>1. How do we use numbers? 2. Why do we use numbers?</p>	<p>Number Theory</p> <p>-----</p> <p>odd number even number equal to</p>	<ul style="list-style-type: none"> Use concrete materials to justify a number as odd or even 	<ul style="list-style-type: none"> Pair manipulatives to show even or odd 	<ul style="list-style-type: none"> Class participation Homework Teacher observation
2.N.1	Number Sense and Operations	<p>Students will understand numbers, multiple ways of representing numbers, relationships among numbers, and number systems.</p> <p>-----</p> <p>1. How do we use numbers? 2. Why do we use numbers?</p>	<p>Number Systems</p> <p>-----</p> <p>skip count</p>	<ul style="list-style-type: none"> Skip count to 100 by 2's, 5's, 10's 	<ul style="list-style-type: none"> Use a hundreds chart to practice skip counting Use nickels and dimes to practice counting 5s and 10s 	<ul style="list-style-type: none"> Number Patterns Chapter 2 Assessment
2.N.10	Number Sense and Operations	<p>Students will understand numbers, multiple ways of representing numbers, relationships among numbers, and number systems.</p> <p>-----</p>	<p>Number Systems</p> <p>-----</p> <p>ordinal number</p>	<ul style="list-style-type: none"> Use and understand verbal ordinal terms 	<ul style="list-style-type: none"> Put objects in order Use directional terms, ordinal 4th, 5th, 10th 	<ul style="list-style-type: none"> Class participation Homework Teacher observation
2.N.11	Number Sense and Operations	<p>Students will understand numbers, multiple ways of representing numbers, relationships among numbers, and number Systems.</p> <p>-----</p>	<p>Number Systems</p> <p>-----</p> <p>ordinal</p>	<ul style="list-style-type: none"> Read written ordinal terms (first through ninth) and use them to represent ordinal relations 	<ul style="list-style-type: none"> Describe the order of things in words: first, second, third 	<ul style="list-style-type: none"> Class participation Homework Teacher observation

PI NUMBER	STRAND	MAJOR UNDERSTANDING ----- ESSENTIAL QUESTION	BAND/TOPIC ----- VOCABULARY	SKILLS/PERFORMANCE INDICATORS	SUGGESTIONS & ACTIVITIES	ASSESSMENTS:
<p>The five process strands (problem solving, reasoning and proof, communication, connections, and representation) are integral to instruction. These strands, the major understandings and their associated performance indicators are to be incorporated into lessons throughout the school year on an ongoing basis.</p>						
<p>MONTH: SEPTEMBER - OCTOBER</p>						
		1. How do we use numbers? 2. Why do we use numbers?				
2.N.5	Number Sense and Operations	Students will understand numbers, multiple ways of representing numbers, relationships among numbers, and number systems. ----- 1. How do we use numbers? 2. Why do we use numbers?	Number Systems ----- hundred chart compare	<ul style="list-style-type: none"> Compare and order numbers to 100 	<ul style="list-style-type: none"> Use 100 chart and terms such as: before, after, between, next 	<ul style="list-style-type: none"> Class participation Homework Teacher observation
2.A.1	Algebra	Students will perform algebraic procedures accurately. ----- 1. How do I use symbols to compare whole numbers?	Equations and Inequalities ----- whole numbers greater than> less than< equal to =	<ul style="list-style-type: none"> Use the symbols <, >, = (with and without the use of a number line) to compare whole numbers up to 100 	<ul style="list-style-type: none"> Use the symbols <, >, -(with and without the use of a number line) to compare whole numbers up to 100 Alligator Pacman Greedy Fish 	<ul style="list-style-type: none"> Class participation Homework Teacher observation
2.N.2	Number Sense and Operations	Students will understand numbers, multiple ways of representing numbers, relationships among numbers, and number systems. ----- 1. How do we use numbers? 2. Why do we use	Number Systems ----- hundred chart	<ul style="list-style-type: none"> Count back from 100 by 1's, 5's 10's using a number chart 	<ul style="list-style-type: none"> Use 100s chart to count backward by 1s, 5s, 10s 	<ul style="list-style-type: none"> Comparing and Ordering Numbers Chapter 3 Assessment

PI NUMBER	STRAND	MAJOR UNDERSTANDING ----- ESSENTIAL QUESTION	BAND/TOPIC ----- VOCABULARY	SKILLS/PERFORMANCE INDICATORS	SUGGESTIONS & ACTIVITIES	ASSESSMENTS:
<p>The five process strands (problem solving, reasoning and proof, communication, connections, and representation) are integral to instruction. These strands, the major understandings and their associated performance indicators are to be incorporated into lessons throughout the school year on an ongoing basis.</p>						
<p>MONTH: SEPTEMBER - OCTOBER</p>						
		numbers?				
2.S.1	Statistics and Probability	<p>Students will collect, organize, display, and analyze data. .</p> <p>-----</p> <ol style="list-style-type: none"> How do I collect, organize and analyze information (data) in my daily life? How do I make predictions from data? 	<p>Collection of Data</p> <p>-----</p> <p>survey</p> <p>formulate questions</p> <p>analyze</p>	<ul style="list-style-type: none"> Formulate questions about themselves and their surroundings 	<ul style="list-style-type: none"> Use information collected to make graphs (e.g., survey class for eye color, favorite pet) 	<ul style="list-style-type: none"> Class participation Homework Teacher observation
2.S.2	Statistics and Probability	<p>Students will collect, organize, display, and analyze data.</p> <p>-----</p> <ol style="list-style-type: none"> How do I collect, organize and analyze information (data) in my daily life? How do I make predictions from data? 	<p>Collection of Data</p> <p>-----</p> <p>survey</p> <p>data</p> <p>tally mark</p> <p>tallies</p> <p>tally table</p>	<ul style="list-style-type: none"> Collect and record data (using tallies) related to the question 	<ul style="list-style-type: none"> Class surveys, Graphing -use a variety of graphs Daily calendar 	<ul style="list-style-type: none"> Class participation Homework Teacher observation
2.S.3	Statistics and Probability	<p>Students will collect, organize, display, and analyze data.</p> <p>-----</p> <ol style="list-style-type: none"> How do I collect, organize and analyze information (data) in my daily life? How do I make 	<p>Organization and Display of Data</p> <p>-----</p> <p>pictograph</p> <p>bar graph</p> <p>representation</p> <p>concrete graph</p>	<ul style="list-style-type: none"> Display data in pictographs and bar graphs using concrete objects or a representation of the -object 	<ul style="list-style-type: none"> Construct graphs using hands-on materials, e.g., favorite candy, footwear 	<ul style="list-style-type: none"> Class participation Homework Teacher observation

PI NUMBER	STRAND	MAJOR UNDERSTANDING ----- ESSENTIAL QUESTION	BAND/TOPIC ----- VOCABULARY	SKILLS/PERFORMANCE INDICATORS	SUGGESTIONS & ACTIVITIES	ASSESSMENTS:
<p>The five process strands (problem solving, reasoning and proof, communication, connections, and representation) are integral to instruction. These strands, the major understandings and their associated performance indicators are to be incorporated into lessons throughout the school year on an ongoing basis.</p>						
<p>MONTH: SEPTEMBER - OCTOBER</p>						
		predictions from data?				
2.S.4	Statistics and Probability	<p>Students will collect, organize, display, and analyze data.</p> <p>-----</p> <ol style="list-style-type: none"> How do I collect, organize and analyze information (data) in my daily life? How do I make predictions from data? 	<p>Analysis of Data</p> <p>-----</p> <p>venn diagrams compare similarities differences categorize</p>	<ul style="list-style-type: none"> Compare and interpret data in terms of describing quantity (similarity or differences) 	<ul style="list-style-type: none"> Graphic organizers, e.g., Venn diagrams. STC Kits 	<ul style="list-style-type: none"> Class participation Homework Teacher observation
2.S.5	Statistics and Probability	<p>Students will make predictions that are based upon data analysis.</p> <p>-----</p> <ol style="list-style-type: none"> How do I collect, organize and analyze information (data) in my daily life? How do I make predictions from data? 	<p>Predictions from Data</p> <p>-----</p> <p>predict sample develop an argument explore guesses investigate justify claims conclude</p>	<ul style="list-style-type: none"> Discuss conclusions and make predictions from graphs 	<ul style="list-style-type: none"> Using information from graphs to predict and summarize Using group results to predict the outcome of class 	<ul style="list-style-type: none"> Tables and Graphs – Chapter 4 Assessment

PI NUMBER	STRAND	MAJOR UNDERSTANDING ----- ESSENTIAL QUESTION	BAND/TOPIC ----- VOCABULARY	SKILLS/PERFORMANCE INDICATORS	SUGGESTIONS & ACTIVITIES	ASSESSMENTS:
<p>The five process strands (problem solving, reasoning and proof, communication, connections, and representation) are integral to instruction. These strands, the major understandings and their associated performance indicators are to be incorporated into lessons throughout the school year on an ongoing basis.</p>						
<p>MONTH: OCTOBER - NOVEMBER</p>						
2.N.15	Number Sense and Operations	Students will understand meanings of operations and procedures, and how they relate to one another. -----	Operations ----- doubles doubles plus 1 fact family related facts addend number sentence sum	<ul style="list-style-type: none"> Determine sums and differences 'of number sentences by various means (e.g., families, related facts, inverse operations, addition " doubles, and doubles plus one) 	<ul style="list-style-type: none"> Addition Inverse operations - teach as turn around facts (related facts) Fact family triangle Addition doubles and doubles plus one Manipulatives Inverse operation fact families 	<ul style="list-style-type: none"> Class participation Homework Teacher observation
2.N.18	Number Sense and Operations	Students will understand meanings of operations and procedures, and how they relate to one another. ----- 1. How do we use numbers? 2. Why do we use numbers? 3. How do we find sums?	Operations ----- doubles	<ul style="list-style-type: none"> Use doubling to add 2-digit numbers 	<ul style="list-style-type: none"> Use strategies like doubles, doubles plus 1, and counting on to master addition facts 	<ul style="list-style-type: none"> Class participation Homework Teacher observation
2.N.16	Number Sense and Operations	Students will understand meanings of operations and procedures, and how they relate to one another. ----- 1. How do we use numbers? 2. Why do we use numbers? 3. How do we find sums?	Operations ----- Make A Ten	<ul style="list-style-type: none"> Use a variety of strategies to solve addition and subtraction problems using one and two-digit numbers with and without regrouping 	<ul style="list-style-type: none"> Make A Ten 	<ul style="list-style-type: none"> Class participation Homework Teacher observation
2.N.8	Number Sense and Operations	Students will understand numbers, multiple ways of representing numbers, relationships among	Number Systems ----- Triple Adding	<ul style="list-style-type: none"> Understand and use the commutative property of addition 	<ul style="list-style-type: none"> Adding together real-world items in different orders Turn around facts 	<ul style="list-style-type: none"> Addition Strategies – Chapter 5 Assessment

PI NUMBER	STRAND	MAJOR UNDERSTANDING ----- ESSENTIAL QUESTION	BAND/TOPIC ----- VOCABULARY	SKILLS/PERFORMANCE INDICATORS	SUGGESTIONS & ACTIVITIES	ASSESSMENTS:
<p>The five process strands (problem solving, reasoning and proof, communication, connections, and representation) are integral to instruction. These strands, the major understandings and their associated performance indicators are to be incorporated into lessons throughout the school year on an ongoing basis.</p>						
<p>MONTH: OCTOBER - NOVEMBER</p>						
		numbers, and number systems. ----- 1. How do we use numbers? 2. Why do we use numbers?			(related facts) <ul style="list-style-type: none"> Strategies for triple adding 	
2.N.16	Number Sense and Operations	Students will understand meanings of operations and procedures, and how they relate to one another. ----- 1. How do we use numbers? 2. Why do we use numbers? 3. How do we find sums?	Operations ----- difference fact family count back subtract	<ul style="list-style-type: none"> Use a variety of strategies to solve addition and subtraction problems using one and two-digit numbers with and without regrouping 	<ul style="list-style-type: none"> Use number line to count back 	<ul style="list-style-type: none"> Class participation Homework Teacher observation
2.N.15	Number Sense and Operations	Students will understand meanings of operations and procedures, and how they relate to one another. ----- 1. How does addition relate to subtraction? 2. What are various ways you can name numbers?	Operations ----- doubles doubles plus 1 fact family related facts missing addend number sentence	<ul style="list-style-type: none"> Determine sums and differences 'of number sentences by various means (e.g., families, related facts, inverse operations, addition " doubles, and doubles plus one) 	<ul style="list-style-type: none"> Addition Inverse operations - teach as turn around facts (related facts) Fact family triangle Addition doubles and doubles plus one Manipulatives Inverse operation fact families 	<ul style="list-style-type: none"> Class participation Homework Teacher observation
2.N.17	Number Sense and Operations	Students will understand meanings of operations and procedures, and how they relate to one another. ----- 1. How do we use numbers? 2. Why do we use	Operations ----- sum odd even difference addends	<ul style="list-style-type: none"> Demonstrate fluency and apply addition and subtraction facts up to and including 18 	<ul style="list-style-type: none"> Repeated practice of basic facts to 12 Understanding the math language of operations (e.g., in all, all together, sum) (flashcards, etc.) Rocket Math 	<ul style="list-style-type: none"> Subtraction Strategies – Chapter 6 Assessment

PI NUMBER	STRAND	MAJOR UNDERSTANDING ----- ESSENTIAL QUESTION	BAND/TOPIC ----- VOCABULARY	SKILLS/PERFORMANCE INDICATORS	SUGGESTIONS & ACTIVITIES	ASSESSMENTS:
<p>The five process strands (problem solving, reasoning and proof, communication, connections, and representation) are integral to instruction. These strands, the major understandings and their associated performance indicators are to be incorporated into lessons throughout the school year on an ongoing basis.</p>						
<p>MONTH: OCTOBER - NOVEMBER</p>						
		<p>numbers? 3. How do we name numbers?</p>			<ul style="list-style-type: none"> Show various ways to make a given number 	

PI NUMBER	STRAND	MAJOR UNDERSTANDING ----- ESSENTIAL QUESTION	BAND/TOPIC ----- VOCABULARY	SKILLS/PERFORMANCE INDICATORS	SUGGESTIONS & ACTIVITIES	ASSESSMENTS:
<p>The five process strands (problem solving, reasoning and proof, communication, connections, and representation) are integral to instruction. These strands, the major understandings and their associated performance indicators are to be incorporated into lessons throughout the school year on an ongoing basis.</p>						
<p>MONTH: NOVEMBER - DECEMBER</p>						
2.N.16	Number Sense and Operations	<p>Students will understand meanings of operations and procedures, and how they relate to one another.</p> <p>-----</p> <ol style="list-style-type: none"> How do we use numbers? Why do we use numbers? How do we find sums? 	<p>Operations ----- Regroup Two digit number Mental Math</p>	<ul style="list-style-type: none"> Use a variety of strategies to solve addition and subtraction problems using one and two-digit numbers with and without regrouping 	<ul style="list-style-type: none"> Regroup ones to tens 	<ul style="list-style-type: none"> Explore 2-Digit Addition – Chapter 7 Assessment
2.N.19	Number Sense and Operations	<p>Students will understand meanings of operations and procedures, and how they relate to one another</p> <p>-----</p> <ol style="list-style-type: none"> How do we use numbers? Why do we use numbers? How do we find sums? 	<p>Operations ----- compensation</p>	<ul style="list-style-type: none"> Use compensation to add 2-digit numbers 	<ul style="list-style-type: none"> Using expanded numbers ($26 + 32 = ?$, $20 + 30 = 50$ and $6 + 2 = 8$, then add $50 + 8 = 58$) 	<ul style="list-style-type: none"> Class participation Homework Teacher observation

PI NUMBER	STRAND	MAJOR UNDERSTANDING ----- ESSENTIAL QUESTION	BAND/TOPIC ----- VOCABULARY	SKILLS/PERFORMANCE INDICATORS	SUGGESTIONS & ACTIVITIES	ASSESSMENTS:
<p>The five process strands (problem solving, reasoning and proof, communication, connections, and representation) are integral to instruction. These strands, the major understandings and their associated performance indicators are to be incorporated into lessons throughout the school year on an ongoing basis.</p>						
<p>MONTH: DECEMBER - JANUARY</p>						
2.N.16	Number Sense and Operations	<p>Students will understand meanings of operations and procedures, and how they relate to one another.</p> <p>-----</p> <ol style="list-style-type: none"> How do we use numbers? Why do we use numbers? How do we find differences? 	<p>Operations ----- regroup estimate</p>	<ul style="list-style-type: none"> Use a variety of strategies to solve addition and subtraction problems using one- and two-digit numbers with and without regrouping 	<ul style="list-style-type: none"> Add and subtract 2-digit numbers with and without regrouping 	<ul style="list-style-type: none"> 2-Digit Addition – Chapter 8 Assessment
2.N.16	Number Sense and Operations	<p>Students will understand meanings of operations and procedures, and how they relate to one another.</p> <p>-----</p> <ol style="list-style-type: none"> How do we use numbers? Why do we use numbers? How do we find differences? 	<p>Operations ----- regroup</p>	<ul style="list-style-type: none"> Use a variety of strategies to solve addition and subtraction problems using one- and two-digit numbers with and without regrouping 	<ul style="list-style-type: none"> Add and subtract 2-digit numbers with and without regrouping Use addition to check subtraction 	<ul style="list-style-type: none"> Explore 2-Digit Subtraction Chapter 9 Assessment
2.N.16	Number Sense and Operations	<p>Students will understand meanings of operations and procedures, and how they relate to one another.</p> <p>-----</p> <ol style="list-style-type: none"> How do we use numbers? Why do we use numbers? How do we find differences? 	<p>Operations ----- regroup</p>	<ul style="list-style-type: none"> Use a variety of strategies to solve addition and subtraction problems using one- and two-digit numbers with and without regrouping 	<ul style="list-style-type: none"> Add and subtract 2-digit numbers with and without regrouping Use addition to check subtraction 	<ul style="list-style-type: none"> 2-Digit Subtraction Chapter 10 Assessment

PI NUMBER	STRAND	MAJOR UNDERSTANDING ----- ESSENTIAL QUESTION	BAND/TOPIC ----- VOCABULARY	SKILLS/PERFORMANCE INDICATORS	SUGGESTIONS & ACTIVITIES	ASSESSMENTS:
<p>The five process strands (problem solving, reasoning and proof, communication, connections, and representation) are integral to instruction. These strands, the major understandings and their associated performance indicators are to be incorporated into lessons throughout the school year on an ongoing basis.</p>						
<p>MONTH: DECEMBER - JANUARY</p>						
2.N.16	Number Sense and Operations	Students will understand meanings of operations and procedures, and how they relate to one another. ----- 1. How do we use numbers? 2. Why do we use numbers? 3. How do we find differences?	Operations ----- regroup	<ul style="list-style-type: none"> Use a variety of strategies to solve addition and subtraction problems using one- and two-digit numbers with and without regrouping 	<ul style="list-style-type: none"> Add and subtract 2-digit numbers with and without regrouping 	<ul style="list-style-type: none"> Practice 2-Digit Addition and Subtraction Chapter 11 Assessment

PI NUMBER	STRAND	MAJOR UNDERSTANDING ----- ESSENTIAL QUESTION	BAND/TOPIC ----- VOCABULARY	SKILLS/PERFORMANCE INDICATORS	SUGGESTIONS & ACTIVITIES	ASSESSMENTS:
<p>The five process strands (problem solving, reasoning and proof, communication, connections, and representation) are integral to instruction. These strands, the major understandings and their associated performance indicators are to be incorporated into lessons throughout the school year on an ongoing basis.</p>						
<p>MONTH: JANUARY - FEBRUARY</p>						
2.M.6	Measurement	<p>Students will use units to give meaning to measurements</p> <p>-----</p> <ol style="list-style-type: none"> 1. What are the different values of coins? 2. How, when and why do we use money? 	<p>Units</p> <p>-----</p> <p>dollar penny nickel dime quarter</p>	<ul style="list-style-type: none"> • Know and recognize coins (penny, nickel, dime, quarter) and bills (\$1, \$5, \$10, and \$20) 	<ul style="list-style-type: none"> • Identify and label coin (penny, nickel, dime, quarter) and bills (\$1, \$5, \$10 and \$20) 	<ul style="list-style-type: none"> • Class participation • Homework • Teacher observation
2.M.7	Measurement	<p>Students will use units to give meaning to measurements</p> <p>-----</p> <ol style="list-style-type: none"> 1. What are the different values of coins? 2. How, when and why do we use money? 	<p>Units</p> <p>-----</p> <p>dollar sign decimal point</p>	<ul style="list-style-type: none"> • Recognize the whole dollar notation as \$1, etc. 	<ul style="list-style-type: none"> • Label bills with dollar notation \$ 	<ul style="list-style-type: none"> • Class participation • Homework • Teacher observation
2.M.8	Measurement	<p>Students will use units to give meaning to measurements</p> <p>-----</p> <ol style="list-style-type: none"> 1. What are the different values of coins? 2. How, when and why do we use money? 	<p>Units</p> <p>-----</p> <p>equivalent least</p>	<ul style="list-style-type: none"> • Identify equivalent combinations to make one dollar 	<ul style="list-style-type: none"> • Use nickels, dimes, quarters to make \$1 (20 nickels, 10 dimes, 4 quarters) 	<ul style="list-style-type: none"> • Class participation • Homework • Teacher observation
2.N.16	Number Sense and Operations	<p>Students will understand meanings of operations and procedures, and how they relate to one another.</p> <p>-----</p> <ol style="list-style-type: none"> 1. How do we use numbers? 2. Why do we use numbers? 3. How do we find differences? 	<p>Operations</p> <p>-----</p> <p>regroup</p>	<ul style="list-style-type: none"> • Use a variety of strategies to solve addition and subtraction problems using one- and two-digit numbers with and without regrouping 	<ul style="list-style-type: none"> • Add and subtract 2-digit numbers with and without regrouping 	<ul style="list-style-type: none"> • Counting money – Chapter 12 Assessment

PI NUMBER	STRAND	MAJOR UNDERSTANDING ----- ESSENTIAL QUESTION	BAND/TOPIC ----- VOCABULARY	SKILLS/PERFORMANCE INDICATORS	SUGGESTIONS & ACTIVITIES	ASSESSMENTS:
<p>The five process strands (problem solving, reasoning and proof, communication, connections, and representation) are integral to instruction. These strands, the major understandings and their associated performance indicators are to be incorporated into lessons throughout the school year on an ongoing basis.</p>						
MONTH: JANUARY - FEBRUARY						
2.A.1	Algebra	Students will perform algebraic procedures accurately. ----- 1. How do I use symbols to compare whole numbers?	Equations and Inequalities ----- whole numbers greater than > less than < equal to =	<ul style="list-style-type: none"> Use the symbols <, >, = (with and without the use of a number line) to compare whole numbers up to 100 	<ul style="list-style-type: none"> Use the symbols <, >, -(with and without the use of a number line) to compare whole numbers up to 100 Alligator Pacman Greedy Fish 	<ul style="list-style-type: none"> Class participation Homework Teacher observation
2.N.16	Number Sense and Operations	Students will understand meanings of operations and procedures, and how they relate to one another. ----- 1. How do we use numbers? 2. Why do we use numbers? 3. How do we find differences?	Operations ----- regroup	<ul style="list-style-type: none"> Use a variety of strategies to solve addition and subtraction problems using one- and two-digit numbers with and without regrouping 	<ul style="list-style-type: none"> Add and subtract 2-digit numbers with and without regrouping 	<ul style="list-style-type: none"> Class participation Homework Teacher observation
2.M.9	Measurement	Students will use units to give meaning to measurements. ----- 1. How do we tell time?	Units ----- half hour	<ul style="list-style-type: none"> Tell time to the half hour and five minutes using both digital and analog clocks 	<ul style="list-style-type: none"> Tell time to the 1/2-hour, with the understanding that a 1/2-hour = 30 minutes Tell time to 5-minute intervals using digital and analog clocks Judy clocks 	<ul style="list-style-type: none"> Telling Time Assessment
2.S.3	Statistics and Probability	Students will collect, organize, display, and analyze data. ----- 1. How do I collect, organize and analyze information (data) in my daily life? 2. How do I make	Organization and Display of Data ----- pictograph bar graph representation	<ul style="list-style-type: none"> Display data in pictographs and bar graphs using concrete objects or a representation of the -object 	<ul style="list-style-type: none"> Construct graphs using hands-on materials, e.g., favorite candy, footwear 	<ul style="list-style-type: none"> Class participation Homework Teacher observation

PI NUMBER	STRAND	MAJOR UNDERSTANDING ----- ESSENTIAL QUESTION	BAND/TOPIC ----- VOCABULARY	SKILLS/PERFORMANCE INDICATORS	SUGGESTIONS & ACTIVITIES	ASSESSMENTS:
<p>The five process strands (problem solving, reasoning and proof, communication, connections, and representation) are integral to instruction. These strands, the major understandings and their associated performance indicators are to be incorporated into lessons throughout the school year on an ongoing basis.</p>						
<p>MONTH: JANUARY - FEBRUARY</p>						
		predictions from data?				
2.S.4	Statistics and Probability	<p>Students will collect, organize, display, and analyze data.</p> <p>-----</p> <ol style="list-style-type: none"> How do I collect, organize and analyze information (data) in my daily life? How do I make predictions from data? 	<p>Analysis of Data</p> <p>-----</p> <p>venn diagrams compare similarities differences categorize</p>	<ul style="list-style-type: none"> Compare and interpret data in terms of describing quantity (similarity or differences) 	<ul style="list-style-type: none"> Graphic organizers, e.g., Venn diagrams. STC Kits 	<ul style="list-style-type: none"> Class participation Homework Teacher observation
2.S.5	Statistics and Probability	<p>Students will make predictions that are based upon data analysis.</p> <p>-----</p> <ol style="list-style-type: none"> How do I collect, organize and analyze information (data) in my daily life? How do I make predictions from data? 	<p>Predictions from Data</p> <p>-----</p> <p>predict conclude develop an argument explore guesses investigate justify claims</p>	<ul style="list-style-type: none"> Discuss conclusions and make predictions from graphs 	<ul style="list-style-type: none"> Using information from graphs to predict and summarize 	<ul style="list-style-type: none"> Class participation Homework Teacher observation

PI NUMBER	STRAND	MAJOR UNDERSTANDING ----- ESSENTIAL QUESTION	BAND/TOPIC ----- VOCABULARY	SKILLS/PERFORMANCE INDICATORS	SUGGESTIONS & ACTIVITIES	ASSESSMENTS:
<p>The five process strands (problem solving, reasoning and proof, communication, connections, and representation) are integral to instruction. These strands, the major understandings and their associated performance indicators are to be incorporated into lessons throughout the school year on an ongoing basis.</p>						
<p>MONTH: JANUARY - FEBRUARY</p>						
2.G.2	Geometry	<p>Students will use visualization and spatial reasoning to analyze characteristics and properties of geometric shapes.</p> <p>-----</p> <ol style="list-style-type: none"> 1. What are shapes? 2. Where do you see shapes? 3. How are shapes alike and different? 	<p>Shapes</p> <p>-----</p> <p>square triangle rectangle reg. shapes irreg. shapes</p>	<ul style="list-style-type: none"> • Identify and appropriately name two-dimensional shapes: circle, square, rectangle, and triangle (both regular and irregular) 	<ul style="list-style-type: none"> • Use a variety of classroom objects to discover properties of 2-D shapes 	<ul style="list-style-type: none"> • Class participation • Homework • Teacher observation
2.G.3	Geometry	<p>Students will use visualization and spatial reasoning to analyze characteristics and properties of geometric shapes.</p> <p>-----</p> <ol style="list-style-type: none"> 1. What are shapes? 2. Where do you see shapes? 3. How are shapes alike and different? 	<p>Shapes</p> <p>-----</p> <p>compose shapes decompose shapes 2-dimensional shapes</p>	<ul style="list-style-type: none"> • Compose (put together) and decompose (break apart) two-dimensional shapes 	<ul style="list-style-type: none"> • Use geoboards and dot paper • Pattern blocks 	<ul style="list-style-type: none"> • Class participation • Homework • Teacher observation
2.G.4	Geometry	<p>Students will identify and justify geometric relationships formally and informally.</p> <p>-----</p> <ol style="list-style-type: none"> 1. What are shapes? 2. Where do you see shapes? 3. How are shapes alike and different? 	<p>Geometric Relationships</p> <p>-----</p> <p>properties</p>	<ul style="list-style-type: none"> • Group objects by like properties 	<ul style="list-style-type: none"> • Use a variety of classroom objects to discover properties of 2-D shapes • Attribute blocks 	<ul style="list-style-type: none"> • Plane Shapes – Chapter 18 Assessment

PI NUMBER	STRAND	MAJOR UNDERSTANDING ----- ESSENTIAL QUESTION	BAND/TOPIC ----- VOCABULARY	SKILLS/PERFORMANCE INDICATORS	SUGGESTIONS & ACTIVITIES	ASSESSMENTS:
<p>The five process strands (problem solving, reasoning and proof, communication, connections, and representation) are integral to instruction. These strands, the major understandings and their associated performance indicators are to be incorporated into lessons throughout the school year on an ongoing basis.</p>						
MONTH: MARCH - JUNE						
2.G.4	Geometry	Students will identify and justify geometric relationships formally and informally. ----- 1. What are shapes? 2. Where do you see shapes? 3. How are shapes alike and different?	Geometric Relationships ----- properties	<ul style="list-style-type: none"> Group objects by like properties 	<ul style="list-style-type: none"> Use a variety of classroom objects to discover properties of 2-D shapes Attribute blocks 	<ul style="list-style-type: none"> Class participation Homework Teacher observation
2.G.2	Geometry	Students will use visualization and spatial reasoning to analyze characteristics and properties of geometric shapes. ----- 1. What are shapes? 2. Where do you see shapes? 3. How are shapes alike and different?	Shapes ----- square triangle rectangle reg. shapes irreg. shapes	<ul style="list-style-type: none"> Identify and appropriately name two-dimensional shapes: circle, square, rectangle, and triangle (both regular and irregular) 	<ul style="list-style-type: none"> Use a variety of classroom objects to discover properties of 2-D shapes 	<ul style="list-style-type: none"> Solid Figures – Chapter 19 Assessment
2.G.6	Geometry	Students will apply transformations and symmetry to analyze problem solving situations. ----- 1. What are shapes? 2. Where do you see shapes? 3. How are shapes alike and different?	Transformational Geometry ----- line symmetry	<ul style="list-style-type: none"> Explore line symmetry 	<ul style="list-style-type: none"> Create symmetrical designs, e.g., use folded paper and scissors to create a symmetrical design Mirrors 	<ul style="list-style-type: none"> Class participation Homework Teacher observation
2.G.1	Geometry	Students will use visualization and spatial	Shapes -----	<ul style="list-style-type: none"> Experiment with slides, flips, and 	<ul style="list-style-type: none"> Use geoboards, pattern blocks, and 	<ul style="list-style-type: none"> Class participation Homework

PI NUMBER	STRAND	MAJOR UNDERSTANDING ----- ESSENTIAL QUESTION	BAND/TOPIC ----- VOCABULARY	SKILLS/PERFORMANCE INDICATORS	SUGGESTIONS & ACTIVITIES	ASSESSMENTS:
<p>The five process strands (problem solving, reasoning and proof, communication, connections, and representation) are integral to instruction. These strands, the major understandings and their associated performance indicators are to be incorporated into lessons throughout the school year on an ongoing basis.</p>						
MONTH: MARCH - JUNE						
		reasoning to analyze characteristics and properties of geometric shapes ----- 1. What are shapes? 2. Where do you see shapes? 3. How are shapes alike and different?	slide flip turn reflection	turns to compare two-dimensional shapes	overhead projector shapes	<ul style="list-style-type: none"> Teacher observation
2.G.5	Geometry	Students will apply transformations and symmetry to analyze problem solving situations. ----- 1. What are shapes? 2. Where do you see shapes? 3. How are shapes alike and different?	Transformational Geometry ----- 2-dimensional	<ul style="list-style-type: none"> Explore and predict the outcome of slides, flips, and turns of two-dimensional shapes 	<ul style="list-style-type: none"> Use pattern blocks, cut paper shapes and other materials to make congruent and non-congruent shapes 	<ul style="list-style-type: none"> Spatial Sense – Chapter 20 Assessment
2.M.10	Measurement	Students will develop strategies for estimating measurements. ----- 1. How do we measure? 2. Why do we measure? 3. When do we use measurement?	Estimation ----- estimate standard unit non-standard units	<ul style="list-style-type: none"> Select and use standard (customary) and non-standard units to estimate measurements 	<ul style="list-style-type: none"> Estimate and check lengths and widths of various items to inch and foot 	<ul style="list-style-type: none"> Class participation Homework Teacher observation
2.M.1	Measurement	Students will determine what can be measured and how, using appropriate methods and formulas. -----	Units of Measurement ----- feet standard units non-standard units	<ul style="list-style-type: none"> Use non-standard and standard units to measure both vertical and horizontal lengths 	<ul style="list-style-type: none"> Estimate and measure lengths and widths of various items to nearest inch and foot Use non-standard 	<ul style="list-style-type: none"> Class participation Homework Teacher observation

PI NUMBER	STRAND	MAJOR UNDERSTANDING ----- ESSENTIAL QUESTION	BAND/TOPIC ----- VOCABULARY	SKILLS/PERFORMANCE INDICATORS	SUGGESTIONS & ACTIVITIES	ASSESSMENTS:
<p>The five process strands (problem solving, reasoning and proof, communication, connections, and representation) are integral to instruction. These strands, the major understandings and their associated performance indicators are to be incorporated into lessons throughout the school year on an ongoing basis.</p>						
MONTH: MARCH - JUNE						
		1. How do we measure? 2. Why do we measure? 3. When do we use measurement?			measurement tools (string, etc.) • Literature: <i>How big is a Foot</i>	
2.M.3	Measurement	Students will determine what can be measured and how, using appropriate methods and formulas. ----- 1. How do we measure? 2. Why do we measure? 3. When do we use measurement?	Units of Measurement ----- longer longest shorter shortest	• Compare and order objects according to the attribute of length	• Discuss, estimate and measure using English system of inches and feet • Compare and order objects by length	• Class participation • Homework • Teacher observation
2.M.2	Measurements	Students will determine what can be measured and how, using appropriate methods and formulas. ----- 1. How do we measure? 2. Why do we measure? 3. When do we use measurement?	Units of Measurement ----- inch feet standard unit	• Use a ruler to measure standard units (including whole inches and whole feet)	• Discuss English system of measuring length	• Class participation • Homework • Teacher observation
2.M.10	Measurement	Students will develop strategies for estimating measurements. ----- 1. How do we measure? 2. Why do we	Estimation ----- estimate standard unit non-standard units	• Select and use standard (customary) and non-standard units to estimate measurements	• Estimate and check lengths and widths of various items to inch and foot	• Customary Measurement: Length and Temperature – Chapter 22 Assessment

PI NUMBER	STRAND	MAJOR UNDERSTANDING ----- ESSENTIAL QUESTION	BAND/TOPIC ----- VOCABULARY	SKILLS/PERFORMANCE INDICATORS	SUGGESTIONS & ACTIVITIES	ASSESSMENTS:
<p>The five process strands (problem solving, reasoning and proof, communication, connections, and representation) are integral to instruction. These strands, the major understandings and their associated performance indicators are to be incorporated into lessons throughout the school year on an ongoing basis.</p>						
<p>MONTH: MARCH - JUNE</p>						
		<p>measure? 3. When do we use measurement?</p>				
2.M.10	Measurement	<p>Students will develop strategies for estimating measurements. ----- 1. How do we measure? 2. Why do we measure? 3. When do we use measurement?</p>	<p>Estimation ----- estimate standard unit non-standard units</p>	<ul style="list-style-type: none"> Select and use standard (customary) and non-standard units to estimate measurements 	<ul style="list-style-type: none"> Estimate and check lengths and widths of various items to inch and foot 	<ul style="list-style-type: none"> Class participation Homework Teacher observation
2.N.6	Number Sense and Operations	<p>Students will understand numbers, multiple ways of representing numbers, relationships among numbers, and number systems. ----- 1. How do we use numbers? 2. Why do we use numbers?</p>	<p>Number Systems ----- place value hundred chart 2-digit number label direction</p>	<ul style="list-style-type: none"> Develop an understanding of the base ten system: 10 ones = 1 ten 10 tens = 1 hundred 10 hundreds = 1 thousand 	<ul style="list-style-type: none"> Use place value blocks and mats Practice regrouping ten and ones using place value models (e.g., 15 = 1 ten and 5 ones, 15 = 15 ones) 	<ul style="list-style-type: none"> Class participation Homework Teacher observation
2.M.6	Measurement	<p>Students will use units to give meaning to measurements ----- 1. What are the different values of coins? 2. How, when and why do we use</p>	<p>Units ----- dollar penny nickel dime quarter</p>	<ul style="list-style-type: none"> Know and recognize coins (penny, nickel, dime, quarter) and bills (\$1, \$5, \$10, and \$20) 	<ul style="list-style-type: none"> Identify and label coin (penny, nickel, dime, quarter) and bills (\$1, \$5, \$10 and \$20) 	<ul style="list-style-type: none"> Numbers to 1,000 – Chapter 27 Assessment

PI NUMBER	STRAND	MAJOR UNDERSTANDING ----- ESSENTIAL QUESTION	BAND/TOPIC ----- VOCABULARY	SKILLS/PERFORMANCE INDICATORS	SUGGESTIONS & ACTIVITIES	ASSESSMENTS:
<p>The five process strands (problem solving, reasoning and proof, communication, connections, and representation) are integral to instruction. These strands, the major understandings and their associated performance indicators are to be incorporated into lessons throughout the school year on an ongoing basis.</p>						
MONTH: MARCH - JUNE						
		money?				
2.A.1	Algebra	Students will perform algebraic procedures accurately. ----- 1. How do I use symbols to compare whole numbers?	Equations and Inequalities ----- whole numbers greater than > less than < equal to =	<ul style="list-style-type: none"> Use the symbols <, >, = (with and without the use of a number line) to compare whole numbers up to 100 	<ul style="list-style-type: none"> Use the symbols <, >, -(with and without the use of a number line) to compare whole numbers up to 100 Alligator Pacman Greedy Fish 	<ul style="list-style-type: none"> Class participation Homework Teacher observation
2.N.1	Number Sense and Operations	Students will understand numbers, multiple ways of representing numbers, relationships among numbers, and number systems. ----- 1. How do we use numbers? 2. Why do we use numbers?	Number Systems ----- skip count	<ul style="list-style-type: none"> Skip count to 100 by 2's, 5's, 10's 	<ul style="list-style-type: none"> Use a hundreds chart to practice skip counting Use nickels and dimes to practice counting 5s and 10s 	<ul style="list-style-type: none"> Class participation Homework Teacher observation
2.A.2	Algebra	Students will recognize, use, and represent algebraically patterns, relations, and functions. ----- 1. What is a pattern? 2. How do I make a pattern? 3. Where do I see patterns?	Patterns, Relations, and Functions ----- increasing seq. decreasing seq.	<ul style="list-style-type: none"> Describe and extend increasing or decreasing (+, -) sequences and patterns (numbers or objects up to 100) 	<ul style="list-style-type: none"> Use counters and 100-chart to show increasing and decreasing patterns to 100 	<ul style="list-style-type: none"> Comparing and Ordering Greater Numbers – Chapter 28 Assessment

PI NUMBER	STRAND	MAJOR UNDERSTANDING ----- ESSENTIAL QUESTION	BAND/TOPIC ----- VOCABULARY	SKILLS/PERFORMANCE INDICATORS	SUGGESTIONS & ACTIVITIES	ASSESSMENTS:
<p>The five process strands (problem solving, reasoning and proof, communication, connections, and representation) are integral to instruction. These strands, the major understandings and their associated performance indicators are to be incorporated into lessons throughout the school year on an ongoing basis.</p>						
MONTH: MARCH - JUNE						
2,PS.4	Problem Solving	Students will solve problems that arise in mathematics and in other contents ----- 1. How do we measure time?	Process Strand ----- calendar month year day date week month year	<ul style="list-style-type: none"> Formulate Problems and Solutions from everyday situations (e.g. counting the number of children in the class, using the calendar to teach counting) 	<ul style="list-style-type: none"> Morning meeting 	<ul style="list-style-type: none"> Class participation Homework Teacher observation
2.PS.2	Problem Solving	Students will build new mathematical knowledge through problem solving ----- 1. How do we make an educated or informed guess?	Process Strand ----- outcome event certain impossible likely unlikely	<ul style="list-style-type: none"> Interpret information correctly, identify the problem and generate possible solutions 	<ul style="list-style-type: none"> Use manipulatives 	<ul style="list-style-type: none"> Probability – Chapter 17 Assessment
2.A.2	Algebra	Students will recognize, use, and represent algebraically patterns, relations, and functions. ----- 1. What is a pattern? 2. How do I make a pattern? 3. Where do I see patterns?	Patterns, Relations, and Functions ----- increasing seq. decreasing seq.	<ul style="list-style-type: none"> Describe and extend increasing or decreasing (+,-) sequences and patterns (numbers or objects up to 100) 	<ul style="list-style-type: none"> Use counters and 100-chart to show increasing and decreasing patterns to 100 	<ul style="list-style-type: none"> Patterns – Chapter 21 Assessment
2.N.20	Number Sense and Operations	Students will understand meanings of operations and procedures, and how they relate to one another. ----- 1. How do we use numbers?	Operations ----- repeated addition multiplication	<ul style="list-style-type: none"> Develop readiness for multiplication by using repeated addition 	<ul style="list-style-type: none"> 	<ul style="list-style-type: none"> Class participation Homework Teacher observation

PI NUMBER	STRAND	MAJOR UNDERSTANDING ----- ESSENTIAL QUESTION	BAND/TOPIC ----- VOCABULARY	SKILLS/PERFORMANCE INDICATORS	SUGGESTIONS & ACTIVITIES	ASSESSMENTS:
<p>The five process strands (problem solving, reasoning and proof, communication, connections, and representation) are integral to instruction. These strands, the major understandings and their associated performance indicators are to be incorporated into lessons throughout the school year on an ongoing basis.</p>						
MONTH: MARCH - JUNE						
		2. Why do we use numbers? 3. How are addition and multiplication related?				
2.N.21	Number Sense and Operations	Students will understand meanings of operations and procedures, and how they relate to one another. ----- 1. How do we use numbers? 2. Why do we use numbers? 3. How are division and subtraction related?	Operations ----- division fair share repeated division repeated subtraction	<ul style="list-style-type: none"> Develop readiness for division by using repeated subtraction, dividing objects into groups (fair share) 	<ul style="list-style-type: none"> Word problems, dividing into equal groups (e.g., how many groups of 2 can you make with 8?) Literature: <i>The Doorbell Rang</i> by Pat Hutchinson 	<ul style="list-style-type: none"> Class participation Homework Teacher observation
2.N.21	Number Sense and Operations	Students will understand meanings of operations and procedures, and how they relate to one another. ----- 1. How do we use numbers? 2. Why do we use numbers? 3. How are division and subtraction related?	Operations ----- division fair share repeated division repeated subtraction	<ul style="list-style-type: none"> Develop readiness for division by using repeated subtraction, dividing objects into groups (fair share) 	<ul style="list-style-type: none"> Word problems, dividing into equal groups (e.g., how many groups of 2 can you make with 8?) Literature: <i>The Doorbell Rang</i> by Pat Hutchinson 	<ul style="list-style-type: none"> Multiplication and Division Concepts – Chapter 30 Assessment

COURSE: Math
GRADE LEVEL: 3

STANDARD	DOMAIN	CLUSTER ----- ESSENTIAL QUESTION	TOPIC -----	SCOPE AND SEQUENCE	ASSESSMENTS:
3.NBT.1 3.NBT.2	Number and Operations in Base Ten	Use place value understanding and properties of operations to perform multi-digit arithmetic. <hr/> 1. How are greater numbers read and written? 2. How can whole numbers be compared and ordered?	Numeration	<ul style="list-style-type: none"> Round whole numbers to the nearest 10 and 100 Fluently add and subtract within 1000 Multiply one digit whole numbers by multiples of 10 	<ul style="list-style-type: none"> Class participation Homework Teacher observation Testing
3.OA.8 3.OA.9	Number and Operations in Base Ten	- Use place value understanding and properties of operations to perform multi-digit arithmetic. <hr/> 1. How can sums and differences be found mentally? 2. How can sums and differences be estimated?	Number Sense: Addition and Subtraction Using Place Value to Add and Subtract	<ul style="list-style-type: none"> Solve problems involving the four operations, and identify and explain patterns Solve 2-step word problems Assess the reasonableness of answers to 2-step word problems 	<ul style="list-style-type: none"> Class participation Homework Teacher observation Testing
3.OA.1 3.OA.3 3.OA.5 3.OA.9	Operations and Algebraic Thinking	<ul style="list-style-type: none"> Represent and solve problems involving multiplication and division Understand properties of multiplication and the relationship between multiplication and division Solve problems involving the four operations, and identify and explain patterns <hr/> 1. What are different strategies for multiplication? 2. How are addition and multiplication related?	Meanings of Multiplication	<ul style="list-style-type: none"> Interpret products of whole numbers Use multiplication within 100 to solve word problems Apply properties of multiplication Identify and explain patterns 	<ul style="list-style-type: none"> Class participation Homework Teacher observation Testing
3.OA.7 3.OA.8 3.NBT.3	Operations and Algebraic Thinking	<ul style="list-style-type: none"> Represent and solve problems involving multiplication and division Multiply and divide within 100 Solve problems involving the four operations, and identify and explain patterns <hr/> What patterns can be used to find certain multiplication facts?	Multiplication Facts: Use Patterns	<ul style="list-style-type: none"> Fluently multiply and divide within 100 Solve 2 step word problems, and assess reasonableness of answers Multiply one-digit whole numbers by multiples of 10 	<ul style="list-style-type: none"> Class participation Homework Teacher observation Testing

STANDARD	DOMAIN	CLUSTER ----- ESSENTIAL QUESTION	TOPIC -----	SCOPE AND SEQUENCE	ASSESSMENTS:
3.MD.7.c 3.MD.8	Operations and Algebraic Thinking	<ul style="list-style-type: none"> • Represent and solve problems involving multiplication and division • Understand properties of multiplication and the relationship between multiplication and division • Solve problems involving the four operations, and identify and explain patterns <hr/> How can unknown multiplication facts be found using known facts?	Multiplication Facts: Use Known Facts	<ul style="list-style-type: none"> • Use area models to represent the distributive property • Solve perimeter problems 	<ul style="list-style-type: none"> • Class participation • Homework • Teacher observation • Testing
3.OA.2 3.OA.4 3.OA.6 3.OA.7	Operations and Algebraic Thinking	<ul style="list-style-type: none"> • Represent and solve problems involving multiplication and division • Understand properties of multiplication and the relationship between multiplication and division • Multiply and divide within 100 • Solve problems involving the four operations, and identify and explain patterns <hr/> 1. What are different meanings of division? 2. How is division related to other operations? 3. How can an unknown division fact be found by thinking of a related multiplication fact?	Meanings of Division / Division Facts	<ul style="list-style-type: none"> • Interpret whole-number quotient of whole numbers • Determine the unknown whole number in a multiplication equation • Determine the unknown whole number in a division equation • Understand division as an unknown factor problem • Fluently divide within 100 	<ul style="list-style-type: none"> • Class participation • Homework • Teacher observation • Testing
3.NF.1 3.NF.2 3.NF.2.a 3.NF.2.b	Number and Operations-Fractions	Develop understanding of fractions as numbers <hr/> What are different interpretations of a fraction?	Understanding Fractions	<ul style="list-style-type: none"> • Interpret proper fractions • Relate fractions to numbers on a number line • Interpret and show unit fractions on a number line 	<ul style="list-style-type: none"> • Class participation • Homework • Teacher observation • Testing

STANDARD	DOMAIN	CLUSTER ----- ESSENTIAL QUESTION	TOPIC -----	SCOPE AND SEQUENCE	ASSESSMENTS:
3.NF.3 3.NF.3.a 3.NF.3.b 3.NF.3.c 3.NF.3.d	Number and Operations- Fractions	Develop understanding fractions as numbers ----- What are different ways to compare fractions?	Fractions Comparison and Equivalence	<ul style="list-style-type: none"> • Explain equivalence of fractions • Relate fraction equivalence to size, and to a number line • Generate and model equivalent fractions • Relate whole numbers and fractions • Compare two fractions with like numerators or denominators and use the symbols $<$, $>$, $=$ 	<ul style="list-style-type: none"> • Class participation • Homework • Teacher observation • Testing
3.G.1 3.G.2	Geometry	Reason with shapes and their attributes ----- How can two-dimensional shapes be described, analyzed, and classified?	Two-Dimensional Shapes and Their Attributes	<ul style="list-style-type: none"> • Understand that shapes in different categories may share attributes • Understand that shared attributes of shapes can define a larger category • Recognize rhombuses, rectangles, and squares as examples of quadrilaterals and draw quadrilaterals that are non-examples • Divide shapes into parts with equal areas • Express the area of each equal part of a shape as a unit fraction of the whole 	<ul style="list-style-type: none"> • Class participation • Homework • Teacher observation • Testing
3.MD.1	Measurement and Data	Solve problems involving measurement and estimation of intervals of time, liquid volume, and masses of objects ----- How can lengths of time be measured and found?	Time	<ul style="list-style-type: none"> • Tell and write time to the nearest minute • Measure time intervals in minutes • Solve word problems involving addition and subtraction of time intervals in minutes • Represent a time problem on a number line 	<ul style="list-style-type: none"> • Class participation • Homework • Teacher observation • Testing

STANDARD	DOMAIN	CLUSTER ----- ESSENTIAL QUESTION	TOPIC -----	SCOPE AND SEQUENCE	ASSESSMENTS:
3.MD.8	Measurement and Data	Geometric measurement: recognize perimeter as an attribute of plane figures and distinguish between linear and area measures <hr/> How can perimeter be measured and found?	Perimeter	<ul style="list-style-type: none"> • Solve perimeter problems • Solve perimeter problems involving finding an unknown side length • Draw rectangles with the same perimeter and different areas. 	<ul style="list-style-type: none"> • Class participation • Homework • Teacher observation • Testing
3.MD.5 3.MD.5.a 3.MD.5.b 3.MD.6 3.MD.7 3.MD.7.a 3.MD.7.b 3.MD.7.c 3.MD.7.d 3.MD.8 3.G.2	Measurement and Data	<ul style="list-style-type: none"> • Geometric measurement: understand concepts of area and relate area to multiplication and to addition • Geometric measurement: recognize perimeter as an attribute of plane figures and distinguish between linear and area measures <hr/> <ol style="list-style-type: none"> 1. What does area mean? 2. What are different ways to find area of a shape? 	Area	<ul style="list-style-type: none"> • Recognize area as an attribute of plane figures • Understand concepts of area measurement and square unit • Measures areas by counting in square inches and square feet • Relate area to the operation of multiplication and division • Multiply side lengths to find areas of rectangles • Use area models to represent the distributive property • Draw rectangles with the same area and different perimeters 	<ul style="list-style-type: none"> • Class participation • Homework • Teacher observation • Testing
3.MD.2	Measurement and Data	Solve problems involving measurement and estimation of intervals of time, liquid volume, and masses of objects <hr/> What are the customary and metric units for measuring capacity and weight and capacity and mass?	Liquid Volume and Mass	<ul style="list-style-type: none"> • Measure and estimate volumes, masses, and weights of objects using standard and metric units. • Solve one-step measurement word problems 	<ul style="list-style-type: none"> • Class participation • Homework • Teacher observation • Testing

STANDARD	DOMAIN	CLUSTER ----- ESSENTIAL QUESTION	TOPIC -----	SCOPE AND SEQUENCE	ASSESSMENTS:
3.MD.3 3.MD.4	Measurement and Data	Represent and interpret data ----- How can data be represented, interpreted, and analyzed?	Data	<ul style="list-style-type: none"> • Draw a scaled picture graph and bar graph to represent a data set with several categories • Solve problems using information presented in scaled bar graphs • Find lengths involving halves and fourths of a unit and display them in a line plot 	<ul style="list-style-type: none"> • Class participation • Homework • Teacher observation • Testing

COURSE: Math
GRADE LEVEL: 4

PI NUMBER	STRAND	MAJOR UNDERSTANDING ----- ESSENTIAL QUESTION	BAND/TOPIC ----- VOCABULARY	SKILLS/PERFORMANCE INDICATORS	SUGGESTIONS & ACTIVITIES	ASSESSMENTS:
<p>The five process strands (problem solving, reasoning and proof, communication, connections and representations) are integral to instruction. These strands, the major understandings and their associated performance indicators are to be incorporated into lessons throughout the school year on an ongoing basis.</p>						
4.N.1	Number Sense and Operations Strand	<p>Students will understand numbers, multiple ways of representing numbers, relationships among numbers, and number systems.</p> <p>-----</p> <ol style="list-style-type: none"> Why are numbers useful in my life? How and why do we use operations? 	<p>Number Systems ----- value digit</p>	<ul style="list-style-type: none"> Skip count by 1,000's 	<ul style="list-style-type: none"> Forward, backward Different starting points Place value chart 	<ul style="list-style-type: none"> Class participation Homework Teacher observation
4.N.2	Number Sense and Operations Strand	<p>Students will understand numbers, multiple ways of representing numbers, relationships among numbers, and number systems.</p> <p>-----</p> <ol style="list-style-type: none"> Why are numbers useful in my life? How and why do we use operations? 	<p>Number Systems ----- 4-digit numbers</p>	<ul style="list-style-type: none"> Read and write whole numbers to 10,000 	<ul style="list-style-type: none"> Place value chart Expanded Form Standard form Word Name 	<ul style="list-style-type: none"> Class participation Homework Teacher observation
4.N.4	Number Sense and Operations Strand	<p>Students will understand numbers, multiple ways of representing numbers, relationships among numbers, and number systems.</p> <p>-----</p> <ol style="list-style-type: none"> Why are numbers useful in 	<p>Number Systems ----- ones tens hundreds thousands regroup</p>	<ul style="list-style-type: none"> Understand the place value structure of the base ten number system: 10 ones = 1 ten 10 tens = 1 hundred 	<ul style="list-style-type: none"> Use base 10 blocks Pocket charts 	<ul style="list-style-type: none"> Class participation Homework Teacher observation

PI NUMBER	STRAND	MAJOR UNDERSTANDING ----- ESSENTIAL QUESTION	BAND/TOPIC ----- VOCABULARY	SKILLS/PERFORMANCE INDICATORS	SUGGESTIONS & ACTIVITIES	ASSESSMENTS:
<p>The five process strands (problem solving, reasoning and proof, communication, connections and representations) are integral to instruction. These strands, the major understandings and their associated performance indicators are to be incorporated into lessons throughout the school year on an ongoing basis.</p>						
		<p>my life? 2. How and why do we use operations?</p>	<p>period</p>	<ul style="list-style-type: none"> 10 hundreds = 1 thousand 10 thousands = 1 ten thousand 		
4.N.5	Number Sense and Operations Strand	<p>Students will understand numbers, multiple ways of representing numbers, relationships among numbers, and number systems. ----- 3. Why are numbers useful in my life? 4. How and why do we use operations?</p>	<p>Number Systems ----- decompose compose</p>	<ul style="list-style-type: none"> Recognize equivalent representations for numbers up to four digits and generate them by decomposing and composing numbers 	<ul style="list-style-type: none"> Convert numbers, words, expanded forms, standard form and vice versa 	<ul style="list-style-type: none"> Class participation Homework Teacher observation
4.S.3	Statistics and Probability	<p>Students will collect, organize, display, and analyze data. ----- 1. How do I understand data?</p>	<p>Organization and Display of Data ----- trend interval bar graph scale on graph table symbols</p>	<ul style="list-style-type: none"> Represent data using tables, bar graphs, and pictographs 	<ul style="list-style-type: none"> Read graphs out of the newspaper 	<ul style="list-style-type: none"> Place value and number sense Chapter 1 Assessment
4.N.3	Number Sense and Operations Strand	<p>Students will understand numbers, multiple ways of representing numbers, relationships among numbers, and number systems. ----- 1. Why are numbers useful in my life?</p>	<p>Number Systems ----- multiple rep compare</p>	<ul style="list-style-type: none"> Compare and order numbers to 10,000 > < = 	<ul style="list-style-type: none"> Base 10 Blocks Place value chart Use index cards with numbers and have students put themselves in order 	<ul style="list-style-type: none"> Class participation Homework Teacher observation

PI NUMBER	STRAND	MAJOR UNDERSTANDING ----- ESSENTIAL QUESTION	BAND/TOPIC ----- VOCABULARY	SKILLS/PERFORMANCE INDICATORS	SUGGESTIONS & ACTIVITIES	ASSESSMENTS:
<p>The five process strands (problem solving, reasoning and proof, communication, connections and representations) are integral to instruction. These strands, the major understandings and their associated performance indicators are to be incorporated into lessons throughout the school year on an ongoing basis.</p>						
		2. How and why do we use operations?				
4.A.2	Algebra	Students will perform algebraic procedures accurately ----- 1. How do I solve a problem using a variable?	Equations and Inequalities ----- not equal to compare contrast	<ul style="list-style-type: none"> Use the symbols $<$, $>$, $=$, and \neq (with and without the use of a number line) to compare whole numbers and unit fractions and decimals (up to hundredths) 	<ul style="list-style-type: none"> 9,522 ? 6,765 using money 	<ul style="list-style-type: none"> Class participation Homework Teacher observation
4.N.3	Number Sense and Operations Strand	Students will understand numbers, multiple ways of representing numbers, relationships among numbers, and number systems. ----- 3. Why are numbers useful in my life? 4. How and why do we use operations?	Number Systems ----- multiple rep compare	<ul style="list-style-type: none"> Compare and order numbers to 10,000 $>$ $<$ $=$ 	<ul style="list-style-type: none"> Base 10 Blocks Place value chart Use index cards with numbers and have students put themselves in order 	<ul style="list-style-type: none"> Class participation Homework Teacher observation
4.S.3	Statistics and Probability	Students will collect, organize, display, and analyze data. ----- 1. How do I understand data?	Organization and Display of Data ----- trend interval bar graph scale on graph table symbols	<ul style="list-style-type: none"> Represent data using tables, bar graphs, and pictographs 	<ul style="list-style-type: none"> Read graphs out of the newspaper 	<ul style="list-style-type: none"> Class participation Homework Teacher observation

PI NUMBER	STRAND	MAJOR UNDERSTANDING ----- ESSENTIAL QUESTION	BAND/TOPIC ----- VOCABULARY	SKILLS/PERFORMANCE INDICATORS	SUGGESTIONS & ACTIVITIES	ASSESSMENTS:
<p>The five process strands (problem solving, reasoning and proof, communication, connections and representations) are integral to instruction. These strands, the major understandings and their associated performance indicators are to be incorporated into lessons throughout the school year on an ongoing basis.</p>						
4.N.26	Number Sense and Operations	Students will compute accurately and make reasonable estimates. ----- 1. How and why do we use operations?	Estimation ----- rounding estimation benchmarking	<ul style="list-style-type: none"> Round numbers less than 1,000 to the nearest tens and hundreds 	<ul style="list-style-type: none"> Rule: Underline place rounded to – check adjacent digit – if 5 or more, go to the next – less than 5, stay Use the number line 	<ul style="list-style-type: none"> Compare and order whole numbers - Chapter 2 Assessment
4.N.14	Number Sense and Operations	Students will understand meanings of operations and procedures, and how they relate to one another. ----- 1. How and why do we use operations?	Operations ----- identity commutative associative property of addition	<ul style="list-style-type: none"> Use a variety of strategies to add and subtract numbers up to 10,000 	<ul style="list-style-type: none"> Model and review Base 10 blocks Place value charts 	<ul style="list-style-type: none"> Class participation Homework Teacher observation
4.N.15	Number Sense and Operations	Students will understand meanings of operations and procedures, and how they relate to one another. ----- 1. How and why do we use operations?	Operations	<ul style="list-style-type: none"> Select appropriate computational and operational methods to solve problems 	<ul style="list-style-type: none"> Problem-solving chart What do we know? What do we need to find out? Rephrase the question Discuss strategies Give a problem 	<ul style="list-style-type: none"> Class participation Homework Teacher observation
4.N.27	Number Sense and Operations	Students will compute accurately and make reasonable estimates. ----- 1. Does my answer make sense?	Estimation ----- rounding estimation	<ul style="list-style-type: none"> Check reasonableness of an answer by using estimation 	<ul style="list-style-type: none"> Does it make sense? 	<ul style="list-style-type: none"> Class participation Homework Teacher observation
4.M.8	Measurement	Students will use units to give meaning to measurements. ----- 1. How do we use	Units -----	<ul style="list-style-type: none"> Make change, using combined coins and dollar amounts 	<ul style="list-style-type: none"> Manipulatives Play money Subtraction Change using least 	<ul style="list-style-type: none"> Add and subtract whole numbers Chapter 3 assessment

PI NUMBER	STRAND	MAJOR UNDERSTANDING ----- ESSENTIAL QUESTION	BAND/TOPIC ----- VOCABULARY	SKILLS/PERFORMANCE INDICATORS	SUGGESTIONS & ACTIVITIES	ASSESSMENTS:										
<p>The five process strands (problem solving, reasoning and proof, communication, connections and representations) are integral to instruction. These strands, the major understandings and their associated performance indicators are to be incorporated into lessons throughout the school year on an ongoing basis.</p>																
		measurement in our daily lives?			number of coins											
4.A.1	Algebra	Students will represent and analyze algebraically a wide variety of problem solving situations. ----- 1. How do I solve a problem using a variable?	Variables and Expressions ----- variable alg. Expression operation expression	<ul style="list-style-type: none"> Evaluate and express relationships using open sentences with one operation 	<ul style="list-style-type: none"> y=2, what is 5-y? 	<ul style="list-style-type: none"> Class participation Homework Teacher observation 										
4.N.14	Number Sense and Operations	Students will understand meanings of operations and procedures, and how they relate to one another. ----- 1. How and why do we use operations?	Operations ----- identity commutative associative property of addition	<ul style="list-style-type: none"> Use a variety of strategies to add and subtract numbers up to 10,000 	<ul style="list-style-type: none"> Model and review Base 10 blocks Place value charts 	<ul style="list-style-type: none"> Class participation Homework Teacher observation 										
4.A.5	Algebra	Students will recognize, use, and represent algebraically patterns, relations, and functions ----- 1. How do I solve a problem using a variable?	Patterns, Relations, and Functions ----- explain justify	<ul style="list-style-type: none"> Analyze a pattern or a whole-number function and state the rule, given a table or an input/output box 	<table border="0"> <tr> <td>Input</td> <td>Output</td> </tr> <tr> <td>3</td> <td>6</td> </tr> <tr> <td>4</td> <td>7</td> </tr> <tr> <td>5</td> <td>8</td> </tr> <tr> <td>6</td> <td>-</td> </tr> </table> <p>Describe the rule</p>	Input	Output	3	6	4	7	5	8	6	-	<ul style="list-style-type: none"> Algebra: use addition and subtraction Chapter 4
Input	Output															
3	6															
4	7															
5	8															
6	-															
4.M.9	Measurement	Students will use units to give meaning to measurements. ----- 1. How do we use measurement in our daily lives?	Units -----	<ul style="list-style-type: none"> Calculate elapsed time in hours and half hours, not crossing A.M./P.M 	<ul style="list-style-type: none"> Clocks Use analog & digital clocks 	<ul style="list-style-type: none"> Class participation Homework Teacher observation 										
4.M.10	Measurement	Students will use units to give meaning to measurements. -----	Units -----	<ul style="list-style-type: none"> Calculate elapsed time in days and weeks, using a 	<ul style="list-style-type: none"> Life: How many weeks to Christmas? 	<ul style="list-style-type: none"> Understand time – Chapter 5 Assessment 										

PI NUMBER	STRAND	MAJOR UNDERSTANDING ----- ESSENTIAL QUESTION	BAND/TOPIC ----- VOCABULARY	SKILLS/PERFORMANCE INDICATORS	SUGGESTIONS & ACTIVITIES	ASSESSMENTS:
<p>The five process strands (problem solving, reasoning and proof, communication, connections and representations) are integral to instruction. These strands, the major understandings and their associated performance indicators are to be incorporated into lessons throughout the school year on an ongoing basis.</p>						
		1. How do we use measurement in our daily lives?		calendar		
4.S.3	Statistics and Probability	Students will collect, organize, display, and analyze data. ----- 1. How do I understand data?	Organization and Display of Data ----- range trend interval bar graph scale on graph table symbols double bar graph	<ul style="list-style-type: none"> • Represent data using tables, bar graphs, and pictographs 	<ul style="list-style-type: none"> • Read graphs out of the newspaper 	<ul style="list-style-type: none"> • Class participation • Homework • Teacher observation
4.S.6	Statistics and Probability	Students will make predictions that are based upon data analysis. ----- 1. How do I organize and understand data?	Predictions from Data ----- conclusion interpret line graph scale	<ul style="list-style-type: none"> • Formulate conclusions and make predictions from graphs 	<ul style="list-style-type: none"> • Integrate social studies and science (e.g., trends in population) • Make a statement from a graph • Make predictions 	<ul style="list-style-type: none"> • Collect, organize, analyze and graph data - Chapter 6 & 7 assessment
4.N.17	Number Sense and Operations	Students will understand meanings of operations and procedures, and how they relate to one another. ----- 1. How are multiplication and division related?	Operations ----- inverse opp multiplication	<ul style="list-style-type: none"> • Use multiplication and division as inverse operations to solve problems 	<ul style="list-style-type: none"> • Use multiplication to check division • Fact families 	<ul style="list-style-type: none"> • Class participation • Homework • Teacher observation
4.N.16	Number Sense and Operations	Students will understand meanings of operations and procedures, and how they relate to one another.	Operations ----- related facts multiples	<ul style="list-style-type: none"> • Understand various meanings of multiplication and division 	<ul style="list-style-type: none"> • Arrays • Fact families • Using multiplication to check division 	<ul style="list-style-type: none"> • Class participation • Homework • Teacher observation

PI NUMBER	STRAND	MAJOR UNDERSTANDING ----- ESSENTIAL QUESTION	BAND/TOPIC ----- VOCABULARY	SKILLS/PERFORMANCE INDICATORS	SUGGESTIONS & ACTIVITIES	ASSESSMENTS:
<p>The five process strands (problem solving, reasoning and proof, communication, connections and representations) are integral to instruction. These strands, the major understandings and their associated performance indicators are to be incorporated into lessons throughout the school year on an ongoing basis.</p>						
		<p>-----</p> <p>1. How are multiplication and division related?</p>	factors			
4.N.6	Number Sense and Operations	<p>Students will understand numbers, multiple ways of representing numbers, relationships among numbers, and number systems.</p> <p>-----</p> <p>1. What does multiplication mean? 2. When and how do I multiply?</p>	<p>Number Systems ----- Assoc. prop. Zero prop array</p>	<ul style="list-style-type: none"> Understand, use, and explain the associative property of multiplication 	<ul style="list-style-type: none"> Demonstration: $(3 \times 6) \times 2 = 3 \times (6 \times 2)$ 	<ul style="list-style-type: none"> Cumulative Property Identity Property
4.N.15	Number Sense and Operations	<p>Students will understand meanings of operations and procedures, and how they relate to one another.</p> <p>-----</p> <p>1. How and why do we use operations?</p>	<p>Operations -----</p>	<ul style="list-style-type: none"> Select appropriate computational and operational methods to solve problems 	<ul style="list-style-type: none"> Problem-solving chart What do we know? What do we need to find out? Rephrase the question Discuss strategies Give a problem 	<ul style="list-style-type: none"> Practice multiplication and Division Facts – Chapter 8 Assessment

PI NUMBER	STRAND	MAJOR UNDERSTANDING ----- ESSENTIAL QUESTION	BAND/TOPIC ----- VOCABULARY	SKILLS/PERFORMANCE INDICATORS	SUGGESTIONS & ACTIVITIES	ASSESSMENTS:										
The five process strands (problem solving, reasoning and proof, communication, connections and representations) are integral to instruction. These strands, the major understandings and their associated performance indicators are to be incorporated into lessons throughout the school year on an ongoing basis																
4.A.1	Algebra	Students will represent and analyze algebraically a wide variety of problem solving situations. ----- 1. How do I solve a problem using a variable?	Variables and Expressions ----- variable alg. Expression operation expression	<ul style="list-style-type: none"> Evaluate and express relationships using open sentences with one operation 	<ul style="list-style-type: none"> $y=2$, what is $5-y$? 	<ul style="list-style-type: none"> Class participation Homework Teacher observation 										
4.N.15	Number Sense and Operations	Students will understand meanings of operations and procedures, and how they relate to one another. ----- 1. How and why do we use operations?	Operations -----	<ul style="list-style-type: none"> Select appropriate computational and operational methods to solve problems 	<ul style="list-style-type: none"> Problem-solving chart What do we know? What do we need to find out? Rephrase the question Discuss strategies Give a problem 	<ul style="list-style-type: none"> Class participation Homework Teacher observation 										
4.A.5	Algebra	Students will recognize, use, and represent algebraically patterns, relations, and functions ----- 1. How do I solve a problem using a variable?	Patterns, Relations, and Functions ----- explain justify	<ul style="list-style-type: none"> Analyze a pattern or a whole-number function and state the rule, given a table or an input/output box 	<table border="0"> <tr> <td>Input</td> <td>Output</td> </tr> <tr> <td>3</td> <td>6</td> </tr> <tr> <td>4</td> <td>7</td> </tr> <tr> <td>5</td> <td>8</td> </tr> <tr> <td>6</td> <td>-</td> </tr> </table> <p>Describe the rule</p>	Input	Output	3	6	4	7	5	8	6	-	<ul style="list-style-type: none"> Algebra: Use Multiplication and Division Facts – Chapter 9 Assessment
Input	Output															
3	6															
4	7															
5	8															
6	-															
4.N.20	Number Sense and Operations	Students will understand meanings of operations and procedures, and how they relate to one another. ----- 1. Why are basic facts so important?	Operations -----	<ul style="list-style-type: none"> Develop fluency in multiplying and dividing multiples of 10 and 100 up to 1,000 	<ul style="list-style-type: none"> Look for patterns 	<ul style="list-style-type: none"> Class participation Homework Teacher observation 										
4.N.18	Number Sense and Operations	Students will understand meanings of operations and procedures, and how they	Operations ----- regrouping	<ul style="list-style-type: none"> Use a variety of strategies to multiply two-digit numbers by 	<ul style="list-style-type: none"> $5 \times 25 = 125$ $(5 \times 20) + (5 \times 5) = 125$ 	<ul style="list-style-type: none"> Class participation Homework Teacher 										

PI NUMBER	STRAND	MAJOR UNDERSTANDING ----- ESSENTIAL QUESTION	BAND/TOPIC ----- VOCABULARY	SKILLS/PERFORMANCE INDICATORS	SUGGESTIONS & ACTIVITIES	ASSESSMENTS:
The five process strands (problem solving, reasoning and proof, communication, connections and representations) are integral to instruction. These strands, the major understandings and their associated performance indicators are to be incorporated into lessons throughout the school year on an ongoing basis						
		relate to one another. ----- 1. How are multiplication and division related?	products	one-digit numbers (with and without regrouping)		observation
4.N.26	Number Sense and Operations	Students will compute accurately and make reasonable estimates. ----- 1. How and why do we use operations?	Estimation ----- rounding estimation	<ul style="list-style-type: none"> Round numbers less than 1,000 to the nearest tens and hundreds 	<ul style="list-style-type: none"> Rule: Underline place rounded to – check adjacent digit – if 5 or more, go to the next – less than 5, stay Use the number line 	<ul style="list-style-type: none"> Class participation Homework Teacher observation
4.N.16	Number Sense and Operations	Students will understand meanings of operations and procedures, and how they relate to one another. ----- 1. How are multiplication and division related?	Operations ----- related facts multiples factors	<ul style="list-style-type: none"> Understand various meanings of multiplication and division 	<ul style="list-style-type: none"> Arrays Fact families Using multiplication to check division 	<ul style="list-style-type: none"> Class participation Homework Teacher observation
4.A.1	Algebra	Students will represent and analyze algebraically a wide variety of problem solving situations. ----- 1. How do I solve a problem using a variable?	Variables and Expressions ----- variable alg. Expression operation expression	<ul style="list-style-type: none"> Evaluate and express relationships using open sentences with one operation 	<ul style="list-style-type: none"> $y=2$, what is $5-y$? 	<ul style="list-style-type: none"> Multiply 1-Digit Number – Chapter 10 Assessment
4.N.20	Number Sense and Operations	Students will understand meanings of operations and procedures, and how they relate to one another. ----- 1. Why are basic facts so important?	Operations -----	<ul style="list-style-type: none"> Develop fluency in multiplying and dividing multiples of 10 and 100 up to 1,000 	<ul style="list-style-type: none"> Look for patterns 	<ul style="list-style-type: none"> Class participation Homework Teacher observation

PI NUMBER	STRAND	MAJOR UNDERSTANDING ----- ESSENTIAL QUESTION	BAND/TOPIC ----- VOCABULARY	SKILLS/PERFORMANCE INDICATORS	SUGGESTIONS & ACTIVITIES	ASSESSMENTS:
The five process strands (problem solving, reasoning and proof, communication, connections and representations) are integral to instruction. These strands, the major understandings and their associated performance indicators are to be incorporated into lessons throughout the school year on an ongoing basis						
4.N.19	Number Sense and Operations	Students will understand meanings of operations and procedures, and how they relate to one another. ----- 1. When and how do I multiply?	Operations ----- reasonableness of a solution	<ul style="list-style-type: none"> Use a variety of strategies to multiply two-digit numbers by two-digit numbers (with and without regrouping) 	<ul style="list-style-type: none"> Graph paper Number patterns Multiples of 10 Rounding and estimation 	<ul style="list-style-type: none"> Class participation Homework Teacher observation
4.N.15	Number Sense and Operations	Students will understand meanings of operations and procedures, and how they relate to one another. ----- 1. How and why do we use operations?	Operations -----	<ul style="list-style-type: none"> Select appropriate computational and operational methods to solve problems 	<ul style="list-style-type: none"> Problem-solving chart What do we know? What do we need to find out? Rephrase the question Discuss strategies Give a problem 	<ul style="list-style-type: none"> Multiply by Tens – Chapter 11 Assessment
4.N.21	Number Sense and Operations Strand	Students will understand meanings of operations and procedures, and how they relate to one another. ----- 1. What does division mean? 2. When and how do I divide?	Operations ----- dividend divisor division	<ul style="list-style-type: none"> Use a variety of strategies to divide two-digit dividends by one-digit divisors (with and without remainders) 	<ul style="list-style-type: none"> Manipulatives Base Ten Blocks Drawing pictures Write multiples 	<ul style="list-style-type: none"> Class participation Homework Teacher observation
4.N.20	Number Sense and Operations	Students will understand meanings of operations and procedures, and how they relate to one another. ----- 1. Why are basic facts so important?	Operations -----	<ul style="list-style-type: none"> Develop fluency in multiplying and dividing multiples of 10 and 100 up to 1,000 	<ul style="list-style-type: none"> Look for patterns 	<ul style="list-style-type: none"> Understanding Division – Chapter 13 Assessment
4.N.27	Number Sense and Operations	Students will compute accurately and make reasonable estimates. -----	Estimation ----- rounding estimation	<ul style="list-style-type: none"> Check reasonableness of an answer by using estimation 	<ul style="list-style-type: none"> Does it make sense? 	<ul style="list-style-type: none"> Class participation Homework Teacher observation

PI NUMBER	STRAND	MAJOR UNDERSTANDING ----- ESSENTIAL QUESTION	BAND/TOPIC ----- VOCABULARY	SKILLS/PERFORMANCE INDICATORS	SUGGESTIONS & ACTIVITIES	ASSESSMENTS:
The five process strands (problem solving, reasoning and proof, communication, connections and representations) are integral to instruction. These strands, the major understandings and their associated performance indicators are to be incorporated into lessons throughout the school year on an ongoing basis						
		1. Does my answer make sense?				
4.N.16	Number Sense and Operations	Students will understand meanings of operations and procedures, and how they relate to one another. ----- 1. How are multiplication and division related?	Operations ----- related facts multiples factors	<ul style="list-style-type: none"> Understand various meanings of multiplication and division 	<ul style="list-style-type: none"> Arrays Fact families Using multiplication to check division 	<ul style="list-style-type: none"> Class participation Homework Teacher observation
4.N.15	Number Sense and Operations	Students will understand meanings of operations and procedures, and how they relate to one another. ----- 1. How and why do we use operations?	Operations -----	<ul style="list-style-type: none"> Select appropriate computational and operational methods to solve problems 	<ul style="list-style-type: none"> Problem-solving chart What do we know? What do we need to find out? Rephrase the question Discuss strategies Give a problem 	<ul style="list-style-type: none"> Class participation Homework Teacher observation
4.N.22	Number Sense and Operations	Students will understand meanings of operations and procedures, and how they relate to one another. ----- 1. What does division mean? 2. When and how do I divide?	Operations ----- remainders	<ul style="list-style-type: none"> Interpret the meaning of remainders 	<ul style="list-style-type: none"> Pictures Base ten blocks Drawing pictures 	<ul style="list-style-type: none"> Divide by 1-Digit Divisors – Chapter 14 Assessment

PI NUMBER	STRAND	MAJOR UNDERSTANDING ----- ESSENTIAL QUESTION	BAND/TOPIC ----- VOCABULARY	SKILLS/PERFORMANCE INDICATORS	SUGGESTIONS & ACTIVITIES	ASSESSMENTS:
The five process strands (problem solving, reasoning and proof, communication, connections and representations) are integral to instruction. These strands, the major understandings and their associated performance indicators are to be incorporated into lessons throughout the school year on an ongoing basis						
4.N.16	Number Sense and Operations	Students will understand meanings of operations and procedures, and how they relate to one another. ----- 1. How are multiplication and division related?	Operations ----- related facts multiples factors	<ul style="list-style-type: none"> Understand various meanings of multiplication and division 	<ul style="list-style-type: none"> Arrays Fact families Using multiplication to check division 	<ul style="list-style-type: none"> Class participation Homework Teacher observation
4.G.2	Geometry	Students will use visualization and spatial reasoning to analyze characteristics and properties of geometric shapes. ----- 1. What are the properties of geometric shapes? 2. Where can I find and use geometry in my daily life?	Shapes ----- point endpoint line segment	<ul style="list-style-type: none"> Identify points and line segments when drawing a plane figure 	<ul style="list-style-type: none"> 	<ul style="list-style-type: none"> Class participation Homework Teacher observation
4.G.1	Geometry	Students will use visualization and spatial reasoning to analyze characteristics and properties of geometric shapes. ----- 1. What are the properties of geometric shapes? 2. Where can I find and use geometry in my daily life?	Shapes ----- polygon 2-dim. Fig closed figure open figure plane figure triangle quadrilateral pentagon hexagon octagon rhombus trapezoid similar congruent	<ul style="list-style-type: none"> Identify and name polygons, recognizing that their names are related to the number of sides and angles (triangle, quadrilateral, pentagon, hexagon, octagon, rhombus, trapezoid, and parallelogram) 	<ul style="list-style-type: none"> National Library of Virtual Manipulatives http://nlvm.usu.edu/en/nav/index.html Tangrams Pattern Blocks 	<ul style="list-style-type: none"> Class participation Homework Teacher observation

PI NUMBER	STRAND	MAJOR UNDERSTANDING ----- ESSENTIAL QUESTION	BAND/TOPIC ----- VOCABULARY	SKILLS/PERFORMANCE INDICATORS	SUGGESTIONS & ACTIVITIES	ASSESSMENTS:
The five process strands (problem solving, reasoning and proof, communication, connections and representations) are integral to instruction. These strands, the major understandings and their associated performance indicators are to be incorporated into lessons throughout the school year on an ongoing basis						
			line of symmetry			
4.A.4	Algebra	Students will recognize, use, and represent algebraically patterns, relations, and functions ----- 1. How do I solve a problem using a variable?	Patterns, Relations, and Functions ----- geo. Patterns numeric patterns	<ul style="list-style-type: none"> Describe, extend, and make generalizations about numeric () and geometric patterns 	<ul style="list-style-type: none"> 2,4,6,8,10,_,_ describe the rule 	<ul style="list-style-type: none"> Number Theory – Chapter 16 Assessment
4.G.1	Geometry	Students will use visualization and spatial reasoning to analyze characteristics and properties of geometric shapes. ----- 3. What are the properties of geometric shapes? 4. Where can I find and use geometry in my daily life?	Shapes ----- polygon 2-dim. Fig closed figure open figure plane figure triangle quadrilateral pentagon hexagon octagon rhombus trapezoid similar congruent line of symmetry	<ul style="list-style-type: none"> Identify and name polygons, recognizing that their names are related to the number of sides and angles (triangle, quadrilateral, pentagon, hexagon, octagon, rhombus, trapezoid, and parallelogram) 	<ul style="list-style-type: none"> National Library of Virtual Manipulatives http://nlvm.usu.edu/en/nav/index.html Tangrams Pattern Blocks 	<ul style="list-style-type: none"> Class participation Homework Teacher observation
4.G.2	Geometry	Students will use visualization and spatial reasoning to analyze characteristics and properties of geometric shapes. ----- 3. What are the properties of	Shapes ----- point endpoint line segment	<ul style="list-style-type: none"> Identify points and line segments when drawing a plane figure 	<ul style="list-style-type: none"> 	<ul style="list-style-type: none"> Lines, Rays, Angles, Plane Figures – Chapters 17, 18 Assessment

PI NUMBER	STRAND	MAJOR UNDERSTANDING ----- ESSENTIAL QUESTION	BAND/TOPIC ----- VOCABULARY	SKILLS/PERFORMANCE INDICATORS	SUGGESTIONS & ACTIVITIES	ASSESSMENTS:
The five process strands (problem solving, reasoning and proof, communication, connections and representations) are integral to instruction. These strands, the major understandings and their associated performance indicators are to be incorporated into lessons throughout the school year on an ongoing basis						
		geometric shapes? 4. Where can I find and use geometry in my daily life?				
4.N.7	Number Sense and Operations	Students will understand numbers, multiple ways of representing numbers, relationships among numbers, and number systems. ----- 1. What is a fraction and why do we use them?	Number Systems ----- fraction part/whole proper fraction improper fraction mixed number	<ul style="list-style-type: none"> Develop an understanding of fractions as locations on number lines and as divisions of whole numbers 	<ul style="list-style-type: none"> Use number lines, rulers and measurement tools Index cards with whole numbers and fractions 	<ul style="list-style-type: none"> Class participation Homework Teacher observation
4.S.2	Statistics and Probability	Students will collect, organize, display, and analyze data. ----- 1. How and why do I collect and analyze data?	Collection of Data ----- make a chart make a diagram trial and error	<ul style="list-style-type: none"> Collect data using observations, surveys, and experiments and record appropriately 	<ul style="list-style-type: none"> Conduct experiments to test hypothesis 	<ul style="list-style-type: none"> Class participation Homework Teacher observation
4.S.5	Statistics and Probability	Students will make predictions that are based upon data analysis. ----- 1. How do I organize and understand data?	Predictions from Data ----- graphical rep charts graphs	<ul style="list-style-type: none"> Develop and make predictions that are based on data 	<ul style="list-style-type: none"> Tie in with social studies and science STC Kits- data charts 	<ul style="list-style-type: none"> Outcomes and Probability – Chapter 23 Assessment
4.M.1	Measurement	Students will determine what can be measured and how, using appropriate methods and formulas. ----- 1. What can I measure and how?	Units of Measurement ----- inch foot yard cm m length	<ul style="list-style-type: none"> Select tools and units (customary and metric) appropriate for the length being measured 	<ul style="list-style-type: none"> Rulers What would be the appropriate measure to use_____? Inch, feet, centimeter, meter 	<ul style="list-style-type: none"> Class participation Homework Teacher observation

PI NUMBER	STRAND	MAJOR UNDERSTANDING ----- ESSENTIAL QUESTION	BAND/TOPIC ----- VOCABULARY	SKILLS/PERFORMANCE INDICATORS	SUGGESTIONS & ACTIVITIES	ASSESSMENTS:
<p>The five process strands (problem solving, reasoning and proof, communication, connections and representations) are integral to instruction. These strands, the major understandings and their associated performance indicators are to be incorporated into lessons throughout the school year on an ongoing basis</p>						
4.M.2	Measurement	<p>Students will determine what can be measured and how, using appropriate methods and formulas.</p> <p>-----</p> <p>1. What can I measure and how?</p>	Units of Measurement	<ul style="list-style-type: none"> Use a ruler to measure to the nearest standard unit (whole, $\frac{1}{2}$ and $\frac{1}{4}$ inches, whole feet, whole yards, whole centimeters, and whole meters) 	<ul style="list-style-type: none"> Measure objects in the room Estimate _____ Actual _____ 	<ul style="list-style-type: none"> Class participation Homework Teacher observation
4.M.3	Measurement	<p>Students will determine what can be measured and how, using appropriate methods and formulas.</p> <p>-----</p> <p>1. What can I measure and how?</p>	Units of Measurement ----- equivalent	<ul style="list-style-type: none"> Know and understand equivalent standard units of length: 12 inches = 1 foot 3 feet = 1 yard 	<ul style="list-style-type: none"> Convert one measurement to another: inch, strips, foot, strips, yard strips Conversion chart 	<ul style="list-style-type: none"> Customary Measurement – Chapter 24 Assessment
4.M.6	Measurement	<p>Students will determine what can be measured and how, using appropriate methods and formulas.</p> <p>-----</p> <p>1. What can I measure and how?</p>	Units of Measurement ----- cup capacity ounce pint quart gallon	<ul style="list-style-type: none"> Select tools and units appropriate to the capacity being measured (milliliters and liters) 	<ul style="list-style-type: none"> Science: use graduated cylinders, beakers Gallon man 	<ul style="list-style-type: none"> Class participation Homework Teacher observation
4.M.4	Measurement	<p>Students will determine what can be measured and how, using appropriate methods and formulas.</p> <p>-----</p> <p>1. What can I measure and how?</p>	Units of Measurement ----- mass ounce pound ton grams kilograms	<ul style="list-style-type: none"> Select tools and units appropriate to the mass of the object being measured (grams and kilograms) 	<ul style="list-style-type: none"> Use a pan balance with a variety of items Predict which weights to use 	<ul style="list-style-type: none"> Metric Measurement – Chapter 25 Assessment

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<p>The five process strands (problem solving, reasoning and proof, communication, connections and representations) are integral to instruction. These strands, the major understandings and their associated performance indicators are to be incorporated into lessons throughout the school year on an ongoing basis</p>						
4.G.3	Geometry	<p>Students will use visualization and spatial reasoning to analyze characteristics and properties of geometric shapes.</p> <p>-----</p> <ol style="list-style-type: none"> 1. What are the properties of geometric shapes? 2. Where can I find and use geometry in my daily life? 	<p>Shapes</p> <p>-----</p> <p>perimeter side unit of meas.</p>	<ul style="list-style-type: none"> • Find perimeter of polygons by adding sides 	<ul style="list-style-type: none"> • Use appropriate units of measure to calculate perimeter using classroom objects 	<ul style="list-style-type: none"> • Class participation • Homework • Teacher observation
4.A.1	Algebra	<p>Students will represent and analyze algebraically a wide variety of problem solving situations.</p> <p>-----</p> <ol style="list-style-type: none"> 1. How do I solve a problem using a variable? 	<p>Variables and Expressions</p> <p>-----</p> <p>variable alg. Expression operation expression</p>	<ul style="list-style-type: none"> • Evaluate and express relationships using open sentences with one operation 	<ul style="list-style-type: none"> • $y=2$, what is $5-y$? 	<ul style="list-style-type: none"> • Class participation • Homework • Teacher observation
4.G.4	Geometry	<p>Students will use visualization and spatial reasoning to analyze characteristics and properties of geometric shapes.</p> <p>-----</p> <ol style="list-style-type: none"> 1. What are the properties of geometric shapes? 2. Where can I find and use geometry in my daily life? 	<p>Shapes</p> <p>-----</p> <p>area</p>	<ul style="list-style-type: none"> • Find the area of a rectangle by counting the number of squares needed to cover the rectangle 	<ul style="list-style-type: none"> • Use graphs to draw different shapes with the same area 	<ul style="list-style-type: none"> • Class participation • Homework • Teacher observation
4.G.5	Geometry	<p>Students will use visualization and spatial reasoning to analyze characteristics and properties of geometric shapes.</p> <p>-----</p> <ol style="list-style-type: none"> 1. What are the properties of 	<p>Shapes</p> <p>-----</p> <p>edge vertex cone cylinder prism</p>	<ul style="list-style-type: none"> • Define and identify vertices, faces, and edges of three-dimensional shapes 	<ul style="list-style-type: none"> • Manipulatives • Virtual Manipulatives http://nlvm.usu.edu/en/nav/index.html 	<ul style="list-style-type: none"> • Perimeter, Area, Volume – Chapters 28, 29, 30 Assessment

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The five process strands (problem solving, reasoning and proof, communication, connections and representations) are integral to instruction. These strands, the major understandings and their associated performance indicators are to be incorporated into lessons throughout the school year on an ongoing basis						
		geometric shapes? 2. Where can I find and use geometry in my daily life?	pyramid sphere solid fig. 3-dim. Fig face vertices			

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The five process strands (problem solving, reasoning and proof, communication, connections and representations) are integral to instruction. These strands, the major understandings and their associated performance indicators are to be incorporated into lessons throughout the school year on an ongoing basis						
4.N.16	Number Sense and Operations	Students will understand meanings of operations and procedures, and how they relate to one another. ----- 1. How are multiplication and division related?	Operations ----- related facts multiples factors	<ul style="list-style-type: none"> Understand various meanings of multiplication and division 	<ul style="list-style-type: none"> Arrays Fact families Using multiplication to check division 	<ul style="list-style-type: none"> Class participation Homework Teacher observation
4.N.19	Number Sense and Operations	Students will understand meanings of operations and procedures, and how they relate to one another. ----- 2. When and how do I multiply?	Operations ----- reasonableness of a solution	<ul style="list-style-type: none"> Use a variety of strategies to multiply two-digit numbers by two-digit numbers (with and without regrouping) 	<ul style="list-style-type: none"> Graph paper Number patterns Multiples of 10 Rounding and estimation 	<ul style="list-style-type: none"> Class participation Homework Teacher observation
4.N.15	Number Sense and Operations	Students will understand meanings of operations and procedures, and how they relate to one another. ----- 1. How and why do we use operations?	Operations -----	<ul style="list-style-type: none"> Select appropriate computational and operational methods to solve problems 	<ul style="list-style-type: none"> Problem-solving chart What do we know? What do we need to find out? Rephrase the question Discuss strategies Give a problem 	<ul style="list-style-type: none"> Multiplying 2-Digit Numbers – Chapter 12 Assessment
4.N.16	Number Sense and Operations	Students will understand meanings of operations and procedures, and how they relate to one another. ----- 1. How are multiplication and division related?	Operations ----- related facts multiples factors	<ul style="list-style-type: none"> Understand various meanings of multiplication and division 	<ul style="list-style-type: none"> Arrays Fact families Using multiplication to check division 	<ul style="list-style-type: none"> Class participation Homework Teacher observation
4.N.20	Number Sense and Operations	Students will understand meanings of operations and procedures, and how they	Operations -----	<ul style="list-style-type: none"> Develop fluency in multiplying and dividing multiples of 	<ul style="list-style-type: none"> Look for patterns 	<ul style="list-style-type: none"> Divide by 2-Digit Numbers – Chapter 15

PI NUMBER	STRAND	MAJOR UNDERSTANDING ----- ESSENTIAL QUESTION	BAND/TOPIC ----- VOCABULARY	SKILLS/PERFORMANCE INDICATORS	SUGGESTIONS & ACTIVITIES	ASSESSMENTS:
The five process strands (problem solving, reasoning and proof, communication, connections and representations) are integral to instruction. These strands, the major understandings and their associated performance indicators are to be incorporated into lessons throughout the school year on an ongoing basis						
		relate to one another. ----- 1. Why are basic facts so important?		10 and 100 up to 1,000		Assessment
4.G.7	Geometry	Students will identify and justify geometric relationships, formally and informally. ----- 1. What are the properties of geometric shapes? 2. Where can I find and use geometry in my daily life?	Geometric Relationships ----- protractor rays	<ul style="list-style-type: none"> Identify points and rays when drawing angles 	<ul style="list-style-type: none"> Protractor 	<ul style="list-style-type: none"> Class participation Homework Teacher observation
4.G.8	Geometry	Students will identify and justify geometric relationships, formally and informally. ----- 1. What are the properties of geometric shapes? 2. Where can I find and use geometry in my daily life?	Geometric Relationships ----- acute angle obtuse angle right angle straight angle	<ul style="list-style-type: none"> Classify angles as acute, obtuse, right, and straight 	<ul style="list-style-type: none"> Protractors Identify in plane figures Rulers 	<ul style="list-style-type: none"> Lines, Rays, Angles – Chapter 17 Assessment
4.N.7	Number Sense and Operations	Students will understand numbers, multiple ways of representing numbers, relationships among numbers, and number systems. ----- 1. What is a fraction and why do we use them?	Number Systems ----- fraction part/whole proper fraction improper fraction mixed number	<ul style="list-style-type: none"> Develop an understanding of fractions as locations on number lines and as divisions of whole numbers 	<ul style="list-style-type: none"> Use number lines, rulers and measurement tools Index cards with whole numbers and fractions 	<ul style="list-style-type: none"> Class participation Homework Teacher observation
4.N.23	Number Sense and Operations	Students will understand meanings of operations and procedures, and how they relate to one another. ----- 1. How do I add and subtract	Operations ----- common denominator	<ul style="list-style-type: none"> Add and subtract proper fractions with common denominators 	<ul style="list-style-type: none"> Cuisenaire Rods Fraction Bars 	<ul style="list-style-type: none"> Understanding Fractions, Add & Subtract Fractions and Mixed Numbers – Chapters 21, 22

PI NUMBER	STRAND	MAJOR UNDERSTANDING ----- ESSENTIAL QUESTION	BAND/TOPIC ----- VOCABULARY	SKILLS/PERFORMANCE INDICATORS	SUGGESTIONS & ACTIVITIES	ASSESSMENTS:
The five process strands (problem solving, reasoning and proof, communication, connections and representations) are integral to instruction. These strands, the major understandings and their associated performance indicators are to be incorporated into lessons throughout the school year on an ongoing basis						
		fractions?				Assessment
4.A.2	Algebra	Students will perform algebraic procedures accurately ----- 1. How do I solve a problem using a variable?	Equations and Inequalities ----- not equal to compare contrast	<ul style="list-style-type: none"> Use the symbols $<$, $>$, $=$, and \neq (with and without the use of a number line) to compare whole numbers and unit fractions and decimals (up to hundredths) 	<ul style="list-style-type: none"> 9,522 ? 6,765 Using money 	<ul style="list-style-type: none"> Class participation Homework Teacher observation
4.N.25	Number Sense and Operations	Students will understand meanings of operations and procedures, and how they relate to one another. ----- 1. How do I add and subtract decimals?	Operations -----	<ul style="list-style-type: none"> Add and subtract decimals to tenths and hundredths using a hundreds chart 	<ul style="list-style-type: none"> Graph paper Line up that decimal!!! 	<ul style="list-style-type: none"> Class participation Homework Teacher observation
4.N.11	Number Sense and Operations	Students will understand numbers, multiple ways of representing numbers, relationships among numbers, and number systems. ----- 1. What is a decimal?	Number Systems -----	<ul style="list-style-type: none"> Read and write decimals to hundredths, using money as a context 	<ul style="list-style-type: none"> Hundred pennies compared to hundreds chart Money Coin 	<ul style="list-style-type: none"> Class participation Homework Teacher observation
4.N.12	Number Sense and Operations	Students will understand numbers, multiple ways of representing numbers, relationships among numbers, and number systems. ----- 1. What is a decimal?	Number Systems -----	<ul style="list-style-type: none"> Use concrete materials and visual models to compare and order decimals (less than 1) to the hundredths place in the context of money 	<ul style="list-style-type: none"> Graph paper Hundreds chart Base 10 blocks 	<ul style="list-style-type: none"> Understanding, Adding, Subtracting, Decimals – Chapter 26, 27 Assessment

COURSE: Math
GRADE LEVEL: 5

PI NUMBER	STRAND	MAJOR UNDERSTANDING ----- ESSENTIAL QUESTION	BAND/TOPIC ----- VOCABULARY	SKILLS/PERFORMANCE INDICATORS	SUGGESTIONS & ACTIVITIES	ASSESSMENTS:
<p>The five process strands (problem solving, reasoning and proof, communication, connections and representations) are integral to instruction. These strands, the major understandings and their associated performance indicators are to be incorporated into lessons throughout the school year on an ongoing basis.</p>						
<p>MONTH: SEPTEMBER - OCTOBER</p>						
5.N.1	Number Sense and Operations	Students will understand numbers, multiple ways of representing numbers, relationships among numbers, and number systems. ----- 1. What are whole numbers? 2. What is the value of numbers?	Number Systems ----- place value whole number base ten number system digit	<ul style="list-style-type: none"> Read and write whole numbers to billions 	<ul style="list-style-type: none"> Standard, written, and expanded forms 	<ul style="list-style-type: none"> Class participation Homework Teacher observation
5.N.2	Number Sense and Operations	Students will understand numbers, multiple ways of representing numbers, relationships among numbers, and number systems. ----- 1. How do we compare and order numbers?	Number Systems ----- greater than less than equal	<ul style="list-style-type: none"> Compare and order numbers to billions 	<ul style="list-style-type: none"> Pocket charts Place value charts (fill- in- the- blank) 	<ul style="list-style-type: none"> Class participation Homework Teacher observation
5.N.3	Number Sense and Operations	Students will understand numbers, multiple ways of representing numbers, relationships among numbers, and number systems. -----	Number Systems ----- number line number system	<ul style="list-style-type: none"> Understand the place value structure of the base ten number system 10 ones = 1 ten 10 tens = 1 hundred 10 hundreds = 1 	<ul style="list-style-type: none"> Use cards (0-9) to build the largest/smallest number 	<ul style="list-style-type: none"> Place value through billions Chapter 1 Assessment

PI NUMBER	STRAND	MAJOR UNDERSTANDING ----- ESSENTIAL QUESTION	BAND/TOPIC ----- VOCABULARY	SKILLS/PERFORMANCE INDICATORS	SUGGESTIONS & ACTIVITIES	ASSESSMENTS:
<p>The five process strands (problem solving, reasoning and proof, communication, connections and representations) are integral to instruction. These strands, the major understandings and their associated performance indicators are to be incorporated into lessons throughout the school year on an ongoing basis.</p>						
<p>MONTH: SEPTEMBER - OCTOBER</p>						
		1. What is the value of numbers?		thousand 10 thousands = 1 ten thousand 10 ten thousands = 1 hundred thousand 10 hundred thousands = 1 million		
5.N.24	Number Sense and Operations	Students will compute accurately and make reasonable estimates. ----- 1. Why do we estimate? 2. What is estimation?	Estimation ----- round a number	<ul style="list-style-type: none"> Round numbers to the nearest hundredth and up to 10,000 	<ul style="list-style-type: none"> Four or below, leave it alone, five or above, give it a shove 	<ul style="list-style-type: none"> Class participation Homework Teacher observation
5.N.8	Number Sense and Operations	Students will understand numbers, multiple ways of representing numbers, relationships among numbers, and number systems. ----- 1. What is the point? 2. How do you read, write and say a decimal?	Number Systems ----- number line number system decimal number decimal point	<ul style="list-style-type: none"> Read, write, and order decimals to thousandths 	<ul style="list-style-type: none"> Place value chart 	<ul style="list-style-type: none"> Class participation Homework Teacher observation
5.N.10	Number Sense and Operations	Students will understand numbers, multiple ways of representing numbers, relationships among numbers, and number systems. ----- 1. How do we compare decimals?	Number Systems ----- inequality	<ul style="list-style-type: none"> Compare decimals using $<$, $>$, or $=$ 	<ul style="list-style-type: none"> Use manipulatives to make visual comparisons 	<ul style="list-style-type: none"> Class participation Homework Teacher observation

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<p>The five process strands (problem solving, reasoning and proof, communication, connections and representations) are integral to instruction. These strands, the major understandings and their associated performance indicators are to be incorporated into lessons throughout the school year on an ongoing basis.</p>						
<p>MONTH: SEPTEMBER - OCTOBER</p>						
5.S.4	Statistics and Probability	Students will make predictions that are based upon data analysis ----- 1. How and why do I collect and record data?	Predictions from Data ----- histogram line plot	<ul style="list-style-type: none"> Formulate conclusions and make predictions from graphs 	•	<ul style="list-style-type: none"> Class participation Homework Teacher observation
5.N.23	Number Sense and Operations	Students will understand meanings of operations and procedures, and how they relate to one another. ----- 1. How do I compute decimals?	Operations ----- calculate quotient product sum difference	<ul style="list-style-type: none"> Use a variety of strategies to add, subtract, multiply, and divide decimals to thousandths 	•	<ul style="list-style-type: none"> Class participation Homework Teacher observation
5.N.26	Number Sense and Operations	Students will compute accurately and make reasonable estimates. ----- 1. What is estimation? 2. Why do we estimate?	Estimation ----- compatible numbers front end estimation rounding reasonable estimation	<ul style="list-style-type: none"> Estimate sums, differences, products, and quotients of decimals 	•	<ul style="list-style-type: none"> Class participation Homework Teacher observation
5.N.27	Number Sense and Operations	Students will compute accurately and make reasonable estimates. ----- 1. What is estimation? 2. Why do we estimate?	Estimation ----- compatible numbers front end estimation rounding reasonable estimation	<ul style="list-style-type: none"> Justify the reasonableness of answers using estimation 	•	<ul style="list-style-type: none"> Decimal Place Value Assessment Chapter 2 Round and estimating whole numbers and decimals Assessment

PI NUMBER	STRAND	MAJOR UNDERSTANDING ----- ESSENTIAL QUESTION	BAND/TOPIC ----- VOCABULARY	SKILLS/PERFORMANCE INDICATORS	SUGGESTIONS & ACTIVITIES	ASSESSMENTS:
<p>The five process strands (problem solving, reasoning and proof, communication, connections and representations) are integral to instruction. These strands, the major understandings and their associated performance indicators are to be incorporated into lessons throughout the school year on an ongoing basis.</p>						
<p>MONTH: SEPTEMBER - OCTOBER</p>						
						Chapter 3

PI NUMBER	STRAND	MAJOR UNDERSTANDING ----- ESSENTIAL QUESTION	BAND/TOPIC ----- VOCABULARY	SKILLS/ PERFORMANCE INDICATORS	SUGGESTIONS & ACTIVITIES	ASSESSMENTS:
<p>The five process strands (problem solving, reasoning and proof, communication, connections and representations) are integral to instruction. These strands, the major understandings and their associated performance indicators are to be incorporated into lessons throughout the school year on an ongoing basis.</p>						
<p>MONTH: OCTOBER - NOVEMBER</p>						
5.S.1	Statistics and Probability	Students will collect, organize, display, and analyze data ----- 1. How and why do I collect and record data?	Collection of Data ----- data	<ul style="list-style-type: none"> Collect and record data from a variety of sources (e.g., newspapers, magazines, polls, charts, and surveys) 	<ul style="list-style-type: none"> Class/survey related to social studies (i.e. population, geographic location) 	<ul style="list-style-type: none"> Class participation Homework Teacher observation
5.S.2	Statistics and Probability	Students will collect, organize, display, and analyze data ----- 1. How and why do I collect and record data?	Organization and Display of Data ----- formulate predictions from graph formulate conclusions from graphs line graph	<ul style="list-style-type: none"> Display data in a line graph to show an increase or decrease over time 	<ul style="list-style-type: none"> Use a variety of CRQ's in preparation for NYS Social Studies exam Create a bar graph or line graph from collected data 	<ul style="list-style-type: none"> Class participation Homework Teacher observation
5.S.3	Statistics and Probability	Students will collect, organize, display, and analyze data ----- 1. What is a mean?	Analysis of Data ----- mean organized lists set of data	<ul style="list-style-type: none"> Calculate the mean for a given set of data and use to describe a set of data 	<ul style="list-style-type: none"> Use a variety of CRQ's in preparation for NYS Social Studies exam 	<ul style="list-style-type: none"> Class participation Homework Teacher observation
5.S.4	Statistics and Probability	Students will make predictions that are based upon data analysis -----	Predictions from Data ----- histogram	<ul style="list-style-type: none"> Formulate conclusions and make predictions from graphs 	<ul style="list-style-type: none"> Use a variety of CRQ's in preparation for NYS Social Studies exam 	<ul style="list-style-type: none"> Class participation Homework Teacher observation
5.A.1	Algebra	Students will represent and analyze algebraically a wide variety of problem solving situations	Variables and Expressions ----- constant	<ul style="list-style-type: none"> Define and use appropriate terminology when referring to 	<ul style="list-style-type: none"> T-charts Inbox/Outbox Hands on equations 	<ul style="list-style-type: none"> Collecting and organizing Data Assessment Chapter 4-6

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<p>MONTH: OCTOBER - NOVEMBER</p>						
			variable algebraic expression	constants, variables, and algebraic expressions		
5.N.16	Number Sense and Operations	Students will understand meanings of operations and procedures, and how they relate to one another ----- 1. How is multiplying a faster way of adding groups of numbers?	Operations ----- multiplier multiplicand product factor	<ul style="list-style-type: none"> Use a variety of strategies to multiply three-digit by three-digit numbers Note: Multiplication by anything greater than a three-digit multiplier/ multiplicand should be done using technology 	<ul style="list-style-type: none"> Lattice multiplication Graph paper 	<ul style="list-style-type: none"> Class participation Homework Teacher observation
5.N.24	Number Sense and Operations	Students will compute accurately and make reasonable estimates ----- 1. Why do we estimate? 2. What is estimation?	Estimation ----- round a number	<ul style="list-style-type: none"> Round numbers to the nearest hundredth and up to 10,000 	<ul style="list-style-type: none"> Four or below, leave it alone, five or above, give it a shove 	<ul style="list-style-type: none"> Class participation Homework Teacher observation
5.N.27	Number Sense and Operations	Students will compute accurately and make reasonable estimates ----- 1. What is estimation? 2. Why do we estimate?	Estimation ----- compatible numbers front end estimation rounding reasonable estimation	<ul style="list-style-type: none"> Justify the reasonableness of answers using estimation 	<ul style="list-style-type: none"> Supermarket budget: Shop for a meal with a given dollar amount (times) Menu Math 	<ul style="list-style-type: none"> Multiplying decimals and whole numbers Assessment Chapter 7
5.N.23	Number Sense and Operations	Students will understand meanings of operations and procedures, and how they relate to one another.	Operations ----- calculate quotient	<ul style="list-style-type: none"> Use a variety of strategies to add, subtract, multiply, and divide decimals 	<ul style="list-style-type: none"> Dice game 	<ul style="list-style-type: none"> Class participation Homework Teacher observation

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<p>The five process strands (problem solving, reasoning and proof, communication, connections and representations) are integral to instruction. These strands, the major understandings and their associated performance indicators are to be incorporated into lessons throughout the school year on an ongoing basis.</p>						
<p>MONTH: OCTOBER - NOVEMBER</p>						
		----- 1. How do I compute decimals?	product sum difference	to thousandths		
5.N.26	Number Sense and Operations	Students will compute accurately and make reasonable estimates ----- 1. What is estimation? 2. Why do we estimate?	Estimation ----- compatible numbers front end estimation rounding reasonable estimation	<ul style="list-style-type: none"> Estimate sums, differences, products, and quotients of decimals 	<ul style="list-style-type: none"> Estimate quotients of decimals 	<ul style="list-style-type: none"> Class participation Homework Teacher observation
5.A.7	Algebra	Students will recognize, use, and represent algebraically patterns, relations, and functions ----- 1. What is an algebraic pattern? 2. How can a pattern be expressed?	Patterns, Relations, and Functions ----- algebraic pattern algebraic relationship algebraically	<ul style="list-style-type: none"> Create and explain patterns and algebraic relationships (e.g., 2, 4, 6, 8...) algebraically: $2n$ (doubling) 	<ul style="list-style-type: none"> Convert T chart into an algebraic expression 	<ul style="list-style-type: none"> Multiplying decimals and whole numbers Assessment Chapter 8
5.N.17	Number Sense and Operations	Students will understand meanings of operations and procedures, and how they relate to one another ----- 1. How do I divide by one and two digit divisors? 2. How is division the inverse operation of multiplication?	Operations ----- divisor dividend quotient divisible remainder	<ul style="list-style-type: none"> Use a variety of strategies to divide three-digit numbers by one- and two-digit numbers Note: Division by anything greater than a two-digit divisor should be done using technology 	<ul style="list-style-type: none"> Graph paper Check using multiplication 	<ul style="list-style-type: none"> Class participation Homework Teacher observation

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<p>The five process strands (problem solving, reasoning and proof, communication, connections and representations) are integral to instruction. These strands, the major understandings and their associated performance indicators are to be incorporated into lessons throughout the school year on an ongoing basis.</p>						
<p>MONTH: OCTOBER - NOVEMBER</p>						
5.N.27	Number Sense and Operations	<p>Students will compute accurately and make reasonable estimates</p> <p>-----</p> <p>1. What is estimation? 2. Why do we estimate?</p>	<p>Estimation</p> <p>-----</p> <p>compatible numbers front end estimation rounding reasonable</p>	<ul style="list-style-type: none"> Justify the reasonableness of answers using estimation 	<ul style="list-style-type: none"> Supermarket budget: Shop for a meal with a given dollar amount (times) Menu Math 	<ul style="list-style-type: none"> Class participation Homework Teacher observation
5.A.7	Algebra	<p>Students will recognize, use, and represent algebraically patterns, relations, and functions</p> <p>-----</p> <p>1. What is an algebraic pattern? 2. How can a pattern be expressed?</p>	<p>Patterns, Relations, and Functions</p> <p>-----</p> <p>algebraic pattern algebraic relationship algebraically</p>	<ul style="list-style-type: none"> Create and explain patterns and algebraic relationships (e.g., 2,4,6,8...) algebraically: $2n$ (doubling) 	<ul style="list-style-type: none"> Convert T-chart into an algebraic expression 	<ul style="list-style-type: none"> Division with 1-digit Divisors Assessment Chapter 9

PI NUMBER	STRAND	MAJOR UNDERSTANDING ----- ESSENTIAL QUESTION	BAND/TOPIC ----- VOCABULARY	SKILLS/PERFORMANCE INDICATORS	SUGGESTIONS & ACTIVITIES	ASSESSMENTS:
<p>The five process strands (problem solving, reasoning and proof, communication, connections and representations) are integral to instruction. These strands, the major understandings and their associated performance indicators are to be incorporated into lessons throughout the school year on an ongoing basis.</p>						
<p>MONTH: NOVEMBER - DECEMBER</p>						
5.N.17	Number Sense and Operations	<p>Students will understand meanings of operations and procedures, and how they relate to one another</p> <p>-----</p> <p>1. How do I divide by one and two digit divisors? 2. How is division the inverse operation of multiplication?</p>	<p>Operations</p> <p>-----</p> <p>divisor dividend quotient divisible remainder</p>	<ul style="list-style-type: none"> Use a variety of strategies to divide three-digit numbers by one- and two-digit numbers Note: Division by anything greater than a two-digit divisor should be done using technology 	<ul style="list-style-type: none"> Graph paper Check using multiplication 	<ul style="list-style-type: none"> Class participation Homework Teacher observation
5.N.27	Number Sense and Operations	<p>Students will compute accurately and make reasonable estimates</p> <p>-----</p> <p>1. What is estimation? 2. Why do we estimate?</p>	<p>Estimation</p> <p>-----</p> <p>compatible numbers front end estimation rounding reasonable estimation</p>	<ul style="list-style-type: none"> Justify the reasonableness of answers using estimation 	<ul style="list-style-type: none"> Supermarket budget: Shop for a meal with a given dollar amount (times) Menu Math 	<ul style="list-style-type: none"> Class participation Homework Teacher observation
5.A.7	Algebra	<p>Students will recognize, use, and represent algebraically patterns, relations, and functions</p> <p>-----</p> <p>1. What is an algebraic pattern? 2. How can a pattern be expressed?</p>	<p>Patterns, Relations, and Functions</p> <p>-----</p> <p>algebraic pattern algebraic relationship algebraically</p>	<ul style="list-style-type: none"> Create and explain patterns and algebraic relationships (e.g., 2, 4,6,8...) algebraically: $2n$ (doubling) 	<ul style="list-style-type: none"> Convert T chart into an algebraic expression 	<ul style="list-style-type: none"> Division with 2-Digit Divisors Assessment Chapter 10
5.N.11	Number Sense and Operations	<p>Students will understand numbers, multiple ways of representing numbers, relationships among numbers, and number systems</p>	<p>Number Systems</p> <p>-----</p> <p>percent</p>	<ul style="list-style-type: none"> Understand that percent means part of 100, and write percents as fractions and decimals 	<ul style="list-style-type: none"> Pizza pieces Blocks, rods and cubes Money Fraction magnets 	<ul style="list-style-type: none"> Class participation Homework Teacher observation

PI NUMBER	STRAND	MAJOR UNDERSTANDING ----- ESSENTIAL QUESTION	BAND/TOPIC ----- VOCABULARY	SKILLS/PERFORMANCE INDICATORS	SUGGESTIONS & ACTIVITIES	ASSESSMENTS:
<p>The five process strands (problem solving, reasoning and proof, communication, connections and representations) are integral to instruction. These strands, the major understandings and their associated performance indicators are to be incorporated into lessons throughout the school year on an ongoing basis.</p>						
<p>MONTH: NOVEMBER - DECEMBER</p>						
		----- 1. What is percent? 2. How are percents as fractions and decimals related?			<ul style="list-style-type: none"> Grades 	
5.N.23	Number Sense and Operations	Students will understand meanings of operations and procedures, and how they relate to one another ----- 1. How do I compute decimals?	Operations ----- calculate quotient product sum difference	<ul style="list-style-type: none"> Use a variety of strategies to add, subtract, multiply, and divide decimals to thousandths 	<ul style="list-style-type: none"> Dice game 	<ul style="list-style-type: none"> Class participation Homework Teacher observation
5.A.7	Algebra	Students will recognize, use, and represent algebraically patterns, relations, and functions ----- 1. What is an algebraic pattern? 2. How can a pattern be expressed?	Patterns, Relations, and Functions ----- algebraic pattern algebraic relationship algebraically	<ul style="list-style-type: none"> Create and explain patterns and algebraic relationships (e.g., 2, 4, 6, 8...) algebraically: $2n$ (doubling) 	<ul style="list-style-type: none"> Convert T chart into an algebraic expression 	<ul style="list-style-type: none"> Decimal Division Assessment Chapter 11
5.N.18	Number Sense and Operations	Students will understand meanings of operations and procedures, and how they relate to one another ----- 1. What is the correct order of operations?	Operations -----	<ul style="list-style-type: none"> Evaluate an arithmetic expression using order of operations including multiplication, division, addition, subtraction and parentheses 	<ul style="list-style-type: none"> Please excuse my dear aunt sally 	<ul style="list-style-type: none"> Class participation Homework Teacher observation
5.N.23	Number Sense and Operations	Students will understand meanings of operations and procedures, and how they	Operations ----- calculate	<ul style="list-style-type: none"> Use a variety of strategies to add, subtract, multiply, 	<ul style="list-style-type: none"> Dice game 	<ul style="list-style-type: none"> Class participation Homework Teacher

PI NUMBER	STRAND	MAJOR UNDERSTANDING ----- ESSENTIAL QUESTION	BAND/TOPIC ----- VOCABULARY	SKILLS/PERFORMANCE INDICATORS	SUGGESTIONS & ACTIVITIES	ASSESSMENTS:
<p>The five process strands (problem solving, reasoning and proof, communication, connections and representations) are integral to instruction. These strands, the major understandings and their associated performance indicators are to be incorporated into lessons throughout the school year on an ongoing basis.</p>						
<p>MONTH: NOVEMBER - DECEMBER</p>						
		relate to one another ----- 1. How do I compute decimals?	quotient product sum difference	and divide decimals to thousandths		observation
5.N.16	Number Sense and Operations	Students will understand meanings of operations and procedures, and how they relate to one another ----- 1. How is multiplying a faster way of adding groups of numbers?	Operations ----- multiplier multiplicand product factor	<ul style="list-style-type: none"> Use a variety of strategies to multiply three-digit by three-digit numbers Note: Multiplication by anything greater than a three-digit multiplier/ multiplicand should be done using technology 	<ul style="list-style-type: none"> Lattice multiplication Graph paper 	<ul style="list-style-type: none"> Class participation Homework Teacher observation
5.A.7	Algebra	Students will recognize, use, and represent algebraically patterns, relations, and functions ----- 1. What is an algebraic pattern? 2. How can a pattern be expressed?	Patterns, Relations, and Functions ----- algebraic pattern algebraic relationship algebraically	<ul style="list-style-type: none"> Create and explain patterns and algebraic relationships (e.g., 2, 4,6,8...) algebraically: $2n$ (doubling) 	<ul style="list-style-type: none"> Convert T chart into an algebraic expression 	<ul style="list-style-type: none"> Order of Operations Assessment Chapter 12
5.N.13	Number Sense and Operations	Students will understand numbers, multiple ways of representing numbers, relationships among numbers, and number systems ----- 1. What is a multiple and the least common multiple? 2. Why is the least common	Number Theory ----- multiple least common multiple (LCM) whole number	<ul style="list-style-type: none"> Calculate multiples in a whole number and the least common multiple of two numbers 	<ul style="list-style-type: none"> Multiple lists Venn Diagram 	<ul style="list-style-type: none"> Class participation Homework Teacher observation

PI NUMBER	STRAND	MAJOR UNDERSTANDING ----- ESSENTIAL QUESTION	BAND/TOPIC ----- VOCABULARY	SKILLS/PERFORMANCE INDICATORS	SUGGESTIONS & ACTIVITIES	ASSESSMENTS:
The five process strands (problem solving, reasoning and proof, communication, connections and representations) are integral to instruction. These strands, the major understandings and their associated performance indicators are to be incorporated into lessons throughout the school year on an ongoing basis.						
MONTH: NOVEMBER - DECEMBER						
		multiple important?				
5.N.14	Number Sense and Operations	Students will understand numbers, multiple ways of representing numbers, relationships among numbers, and number systems ----- 1. What is a factor?	Number Theory ----- factors	<ul style="list-style-type: none"> Identify the factors of a given number 	<ul style="list-style-type: none"> Factor trees/lists 	<ul style="list-style-type: none"> Class participation Homework Teacher observation
5.N.15	Number Sense and Operations	Students will understand numbers, multiple ways of representing numbers, relationships among numbers, and number systems ----- 1. What is a factor, common factor, and greatest common factor? 2. Why is the GCF important?	Number Theory ----- greatest common factor (GCF) common factor	<ul style="list-style-type: none"> Find the common factors and the greatest common factor of two numbers 	<ul style="list-style-type: none"> Venn Diagrams Lists 	<ul style="list-style-type: none"> Class participation Homework Teacher observation
5.N.17	Number Sense and Operations	Students will understand meanings of operations and procedures, and how they relate to one another ----- 1. How do I divide by one and two digit divisors? 2. How is division the inverse operation of multiplication	Operations ----- divisor dividend quotient divisible remainder	<ul style="list-style-type: none"> Use a variety of strategies to divide three-digit numbers by one- and two-digit numbers Note: Division by anything greater than a two-digit divisor should be done using technology 	<ul style="list-style-type: none"> Graph paper Check using multiplication 	<ul style="list-style-type: none"> LCD, GCF and Divisibility Assessment Chapter 13

PI NUMBER	STRAND	MAJOR UNDERSTANDING ----- ESSENTIAL QUESTION	BAND/TOPIC ----- VOCABULARY	SKILLS/PERFORMANCE INDICATORS	SUGGESTIONS & ACTIVITIES	ASSESSMENTS:
<p>The five process strands (problem solving, reasoning and proof, communication, connections and representations) are integral to instruction. These strands, the major understandings and their associated performance indicators are to be incorporated into lessons throughout the school year on an ongoing basis.</p>						
<p>MONTH: NOVEMBER - DECEMBER</p>						
5.N.12	Number Sense and Operations	<p>Students will understand numbers, multiple ways of representing numbers, relationships among numbers, and number systems</p> <p>-----</p> <p>1. What are prime and composite numbers?</p>	<p>Number Theory</p> <p>-----</p> <p>prime composite divisors divisible factor</p>	<ul style="list-style-type: none"> Recognize that some numbers are only divisible by one and themselves (prime) and others have multiple divisors (composite) 	<ul style="list-style-type: none"> 100's chart game Magazine activity 	<ul style="list-style-type: none"> Class participation Homework Teacher observation
5.A.7	Algebra	<p>Students will recognize, use, and represent algebraically patterns, relations, and functions</p> <p>-----</p> <p>1. What is an algebraic pattern? 2. How can a pattern be expressed?</p>	<p>Patterns, Relations, and Functions</p> <p>-----</p> <p>algebraic pattern algebraic relationship algebraically</p>	<ul style="list-style-type: none"> Create and explain patterns and algebraic relationships (e.g., 2, 4, 6, 8...) algebraically: $2n$ (doubling) 	<ul style="list-style-type: none"> Convert T chart into an algebraic expression 	<ul style="list-style-type: none"> Prime/Composite Numbers Assessment Chapter 14

PI NUMBER	STRAND	MAJOR UNDERSTANDING ----- ESSENTIAL QUESTION	BAND/TOPIC ----- VOCABULARY	SKILLS/PERFORMANCE INDICATORS	SUGGESTIONS & ACTIVITIES	ASSESSMENTS:
<p>The five process strands (problem solving, reasoning and proof, communication, connections and representations) are integral to instruction. These strands, the major understandings and their associated performance indicators are to be incorporated into lessons throughout the school year on an ongoing basis</p> <p>MONTH: DECEMBER - JANUARY</p>						
5.N.4	Number Sense and Operations	<p>Students will understand numbers, multiple ways of representing numbers, relationships among numbers, and number systems</p> <p>-----</p> <p>1. What is a fraction? 2. What is an equivalent fraction? 3. How do you make an equivalent fraction?</p>	<p>Number Systems</p> <p>-----</p> <p>fraction equivalent fraction denominator numerator</p>	<ul style="list-style-type: none"> • Create equivalent fractions, given a fraction 	<ul style="list-style-type: none"> • Fraction bars • Fraction magnets • Virtual Manipulatives Website 	<ul style="list-style-type: none"> • Class participation • Homework • Teacher observation
5.N.5	Number Sense and Operations	<p>Students will understand numbers, multiple ways of representing numbers, relationships among numbers, and number systems</p> <p>-----</p> <p>1. How do we compare and order fractions</p>	<p>Number Systems</p> <p>-----</p> <p>denominator least common denominator</p>	<ul style="list-style-type: none"> • Compare and order fractions including unlike denominators (with and without the use of a number line) Note: Commonly used fractions such as those that might be indicated on ruler, measuring cup, etc 	<ul style="list-style-type: none"> • Fraction bars • Fraction Magnets • Cross multiplying 	<ul style="list-style-type: none"> • Class participation • Homework • Teacher observation
5.N.9	Number Sense and Operations	<p>Students will understand numbers, multiple ways of representing numbers, relationships among numbers, and number systems</p> <p>-----</p> <p>1. How do we compare</p>	<p>Number Systems</p> <p>-----</p> <p>inequality</p>	<ul style="list-style-type: none"> • Compare fractions using $<$, $>$, or $=$ 	<ul style="list-style-type: none"> • Fraction bars • Magnet Bars • Virtual Library 	<ul style="list-style-type: none"> • Class participation • Homework • Teacher observation

PI NUMBER	STRAND	MAJOR UNDERSTANDING ----- ESSENTIAL QUESTION	BAND/TOPIC ----- VOCABULARY	SKILLS/PERFORMANCE INDICATORS	SUGGESTIONS & ACTIVITIES	ASSESSMENTS:
<p>The five process strands (problem solving, reasoning and proof, communication, connections and representations) are integral to instruction. These strands, the major understandings and their associated performance indicators are to be incorporated into lessons throughout the school year on an ongoing basis</p>						
<p>MONTH: DECEMBER - JANUARY</p>						
		fractions?				
5.N.19	Number Sense and Operations	<p>Students will understand meanings of operations and procedures, and how they relate to one another</p> <p>-----</p> <p>1. How and why do I simplify fractions? 2. What is lowest terms and simplest form?</p>	<p>Operations ----- simplest form lowest term</p>	<ul style="list-style-type: none"> Simplify fractions to lowest term 	<ul style="list-style-type: none"> Fraction bars 	<ul style="list-style-type: none"> Class participation Homework Teacher observation
5.N.20	Number Sense and Operations	<p>Students will understand meanings of operations and procedures, and how they relate to one another</p> <p>-----</p> <p>1. What are mixed numbers and improper fractions? 2. Why are mixed improper fractions and mixed numbers equivalent?</p>	<p>Operations ----- improper fractions mixed numbers</p>	<ul style="list-style-type: none"> Convert improper fractions to mixed numbers, and mixed numbers to improper fractions 	<ul style="list-style-type: none"> Pizza or Pie Pictorials 	<ul style="list-style-type: none"> Class participation Homework Teacher observation
5.N.11	Number Sense and Operations	<p>Students will understand numbers, multiple ways of representing numbers, relationships among numbers, and number systems</p> <p>-----</p> <p>1. What is percent? 2. How are percents as fractions and decimals related?</p>	<p>Number Systems ----- percent</p>	<ul style="list-style-type: none"> Understand that percent means part of 100, and write percents as fractions and decimals 	<ul style="list-style-type: none"> Pizza pieces Blocks, rods and cubes Money Fraction magnets Grades 	<ul style="list-style-type: none"> Equivalent Fractions Assessment Chapter 15

PI NUMBER	STRAND	MAJOR UNDERSTANDING ----- ESSENTIAL QUESTION	BAND/TOPIC ----- VOCABULARY	SKILLS/PERFORMANCE INDICATORS	SUGGESTIONS & ACTIVITIES	ASSESSMENTS:
<p>The five process strands (problem solving, reasoning and proof, communication, connections and representations) are integral to instruction. These strands, the major understandings and their associated performance indicators are to be incorporated into lessons throughout the school year on an ongoing basis</p>						
<p>MONTH: DECEMBER - JANUARY</p>						
5.N.19	Number Sense and Operations	<p>Students will understand meanings of operations and procedures, and how they relate to one another</p> <p>-----</p> <p>1. How and why do I simplify fractions? 2. What is lowest terms and simplest form?</p>	<p>Operations ----- simplest form lowest term</p>	<ul style="list-style-type: none"> Simplify fractions to lowest terms 	<ul style="list-style-type: none"> Fraction bars 	<ul style="list-style-type: none"> Class participation Homework Teacher observation
5.N.21	Number Sense and Operations	<p>Students will understand meanings of operations and procedures, and how they relate to one another</p> <p>-----</p> <p>1. How do I add and subtract fractions?</p>	<p>Operations -----</p>	<ul style="list-style-type: none"> Use a variety of strategies to add and subtract fractions with like denominators 	<ul style="list-style-type: none"> Pizza or pie pictorials 	<ul style="list-style-type: none"> Class participation Homework Teacher observation
5.N.25	Number Sense and Operations	<p>Students will compute accurately and make reasonable estimates</p> <p>-----</p> <p>1. Why do we estimate? 2. What is estimation?</p>	<p>Estimation ----- denominator</p>	<ul style="list-style-type: none"> Estimate sums and differences of fractions with like denominators 	<ul style="list-style-type: none"> Fraction bars 	<ul style="list-style-type: none"> Adding and subtracting Fractions Assessment Chapter 16
5.N.19	Number Sense and Operations	<p>Students will understand meanings of operations and procedures, and how they relate to one another</p> <p>-----</p> <p>1. How and why do I simplify fractions? 2. What is lowest terms and simplest form?</p>	<p>Operations ----- simplest form lowest term</p>	<ul style="list-style-type: none"> Simplify fractions to lowest terms 	<ul style="list-style-type: none"> Fraction Overhead Transparency Manipulatives 	<ul style="list-style-type: none"> Class participation Homework Teacher observation

PI NUMBER	STRAND	MAJOR UNDERSTANDING ----- ESSENTIAL QUESTION	BAND/TOPIC ----- VOCABULARY	SKILLS/PERFORMANCE INDICATORS	SUGGESTIONS & ACTIVITIES	ASSESSMENTS:
<p>The five process strands (problem solving, reasoning and proof, communication, connections and representations) are integral to instruction. These strands, the major understandings and their associated performance indicators are to be incorporated into lessons throughout the school year on an ongoing basis</p>						
<p>MONTH: DECEMBER - JANUARY</p>						
5.N.21	Number Sense and Operations	<p>Students will understand meanings of operations and procedures, and how they relate to one another</p> <p>-----</p> <p>1. How do I add and subtract fractions?</p>	<p>Operations</p> <p>-----</p>	<ul style="list-style-type: none"> Use a variety of strategies to add and subtract fractions with like denominators 	<ul style="list-style-type: none"> Fraction bars 	<ul style="list-style-type: none"> Class participation Homework Teacher observation
5.N.22	Number Sense and Operations	<p>Students will understand meanings of operations and procedures, and how they relate to one another</p> <p>-----</p> <p>1. How do I add and subtract mixed numbers?</p>	<p>Operations</p> <p>-----</p> <p>mixed number</p>	<ul style="list-style-type: none"> Add and subtract mixed numbers with like denominators 	<ul style="list-style-type: none"> Fraction bars 	<ul style="list-style-type: none"> Mixed Numbers Assessment Chapter 17
5.M.8	Measurement	<p>Students will use units to give meaning to measurements.</p> <p>-----</p> <p>1. What is an angle? 2. How do I measure and draw an angle using a protractor?</p>	<p>Units</p> <p>-----</p> <p>obtuse acute right straight protractor</p>	<ul style="list-style-type: none"> Measure and draw angles using a protractor 	<ul style="list-style-type: none"> Measure and draw angles 	<ul style="list-style-type: none"> Class participation Homework Teacher observation
5.G.2	Geometry	<p>Students will identify and justify geometric relationships, formally and informally.</p> <p>-----</p> <p>1. What are similar triangles?</p>	<p>Geometric Relationships</p> <p>-----</p> <p>similar</p>	<ul style="list-style-type: none"> Identify pairs of similar triangles 	<ul style="list-style-type: none"> Geoboards Compare triangles <p>http://nlvm.usu.edu/en/nav/vlibrary.html</p>	<ul style="list-style-type: none"> Class participation Homework Teacher observation
5.G.9	Geometry	<p>Students will identify and justify geometric relationships, formally and informally.</p> <p>-----</p> <p>1. What are congruent triangles?</p>	<p>Geometric Relationships</p> <p>-----</p> <p>congruent</p>	<ul style="list-style-type: none"> Identify pairs of congruent triangles 	<ul style="list-style-type: none"> Geoboards Compare triangles <p>http://nlvm.usu.edu/en/nav/vlibrary.html</p>	<ul style="list-style-type: none"> Class participation Homework Teacher observation

PI NUMBER	STRAND	MAJOR UNDERSTANDING ----- ESSENTIAL QUESTION	BAND/TOPIC ----- VOCABULARY	SKILLS/PERFORMANCE INDICATORS	SUGGESTIONS & ACTIVITIES	ASSESSMENTS:
<p>The five process strands (problem solving, reasoning and proof, communication, connections and representations) are integral to instruction. These strands, the major understandings and their associated performance indicators are to be incorporated into lessons throughout the school year on an ongoing basis</p>						
<p>MONTH: DECEMBER - JANUARY</p>						
5.G.10	Geometry	Students will identify and justify geometric relationships, formally and informally. ----- 1. What are congruent triangles?	Geometric Relationships -----	<ul style="list-style-type: none"> Identify corresponding parts of congruent triangles 	<ul style="list-style-type: none"> Geoboards http://nlvm.usu.edu/en/nav/vlibrary.html 3 Way Match Up 	<ul style="list-style-type: none"> Class participation Homework Teacher observation
5.G.7	Geometry	Students will identify and justify geometric relationships, formally and informally. ----- 1. What is the total number of degrees in a triangle?	Geometric Relationships -----	<ul style="list-style-type: none"> Know that the sum of the interior angles of a triangle is 180 degrees 	<ul style="list-style-type: none"> Draw triangle, cut out and measure angles to 180° 	<ul style="list-style-type: none"> Class participation Homework Teacher observation
5.G.8	Geometry	Students will identify and justify geometric relationships, formally and informally. ----- 1. What is the total number of degrees in a triangle?	Geometric Relationships -----	<ul style="list-style-type: none"> Find a missing angle when given two angles of a triangle 	<ul style="list-style-type: none"> $A+B+? = 180^\circ$ 	<ul style="list-style-type: none"> Class participation Homework Teacher observation
5.G.5	Geometry	Students will identify and justify geometric relationships, formally and informally. ----- 1. What is a quadrilateral?	Geometric Relationships ----- quadrilateral	<ul style="list-style-type: none"> Know that the sum of the interior angles of a quadrilateral is 360 degrees 	<ul style="list-style-type: none"> Measure angles of various quadrilaterals 	<ul style="list-style-type: none"> Class participation Homework Teacher observation
5.G.11	Geometry	Students will apply transformations and symmetry to analyze problem solving situations. ----- 1. What is symmetry?	Transformational Geometry ----- symmetry line of symmetry	<ul style="list-style-type: none"> Identify and draw lines of symmetry of basic geometric shapes 	<ul style="list-style-type: none"> http://www.pbskids.com (Cyberchase) 	<ul style="list-style-type: none"> Class participation Homework Teacher observation
5.A.8	Algebra	Students will recognize, use, and represent algebraically patterns, relations, and functions. -----	Patterns, Relations, and Functions -----	<ul style="list-style-type: none"> Create algebraic or geometric patterns using concrete objects 	<ul style="list-style-type: none"> Create tessellations http://www.math.nmsu.edu/breakingaway/main.html 	<ul style="list-style-type: none"> Lines and Angles Assessment Chapter 20

PI NUMBER	STRAND	MAJOR UNDERSTANDING ----- ESSENTIAL QUESTION	BAND/TOPIC ----- VOCABULARY	SKILLS/PERFORMANCE INDICATORS	SUGGESTIONS & ACTIVITIES	ASSESSMENTS:
<p>The five process strands (problem solving, reasoning and proof, communication, connections and representations) are integral to instruction. These strands, the major understandings and their associated performance indicators are to be incorporated into lessons throughout the school year on an ongoing basis</p>						
<p>MONTH: DECEMBER - JANUARY</p>						
		<ol style="list-style-type: none"> 1. How do we make or complete geometric and algebraic patterns? 2. What is a tessellation? 	tessellations translate	or visual drawings (e.g., rotate and shade geometric shapes)		

PI NUMBER	STRAND	MAJOR UNDERSTANDING ----- ESSENTIAL QUESTION	BAND/ TOPIC ----- VOCABULARY	SKILLS/ PERFORMANCE INDICATORS	SUGGESTIONS & ACTIVITIES	ASSESSMENTS:
<p>The five process strands (problem solving, reasoning and proof, communication, connections and representations) are integral to instruction. These strands, the major understandings and their associated performance indicators are to be incorporated into lessons throughout the school year on an ongoing basis.</p>						
<p>MONTH: JANUARY - FEBRUARY</p>						
5.G.6	Geometry	<p>Students will identify and justify geometric relationships, formally and informally.</p> <p>-----</p> <p>1. How do we classify triangles?</p>	<p>Geometric Relationships</p> <p>-----</p> <p>scalene isosceles equilateral acute obtuse right triangles classify</p>	<ul style="list-style-type: none"> Classify triangles by properties of their angles and sides 	<ul style="list-style-type: none"> Geoboards Identify given triangles 	<ul style="list-style-type: none"> Class participation Homework Teacher observation
5.G.4	Geometry	<p>Students will identify and justify geometric relationships, formally and informally.</p> <p>-----</p> <p>1. What are the properties of different quadrilaterals?</p>	<p>Geometric Relationships</p> <p>-----</p> <p>parallelogram trapezoid square rhombus rectangle</p>	<ul style="list-style-type: none"> Classify quadrilaterals by properties of their angles and sides 	<ul style="list-style-type: none"> Tangrams Geoboards http://www.pbskids.com (Cyberchase) http://www.eduplace.com/kids (Robo-Packer) 	<ul style="list-style-type: none"> Class participation Homework Teacher observation
5.A.8	Algebra	<p>Students will recognize, use, and represent algebraically patterns, relations, and functions.</p> <p>-----</p> <p>3. How do we make or complete geometric and algebraic patterns?</p> <p>4. What is a tessellation?</p>	<p>Patterns, Relations, and Functions</p> <p>-----</p> <p>tessellations translate</p>	<ul style="list-style-type: none"> Create algebraic or geometric patterns using concrete objects or visual drawings (e.g., rotate and shade geometric shapes) 	<ul style="list-style-type: none"> Create tessellations http://www.math.nmsu.edu/breakingaway/main.html 	<ul style="list-style-type: none"> Triangles, Quadrilaterals Assessment Chapter 21
5.M.1	Measurement	<p>Students will determine what can be measured and how, using appropriate methods and formulas</p>	<p>Units of Measurement</p> <p>-----</p>	<ul style="list-style-type: none"> Use a ruler to measure to the nearest inch, and inch 	<ul style="list-style-type: none"> Estimate measurement of shapes, then measure actual and compare (use customary measure) 	<ul style="list-style-type: none"> Class participation Homework Teacher observation

PI NUMBER	STRAND	MAJOR UNDERSTANDING ----- ESSENTIAL QUESTION	BAND/ TOPIC ----- VOCABULARY	SKILLS/ PERFORMANCE INDICATORS	SUGGESTIONS & ACTIVITIES	ASSESSMENTS:
<p>The five process strands (problem solving, reasoning and proof, communication, connections and representations) are integral to instruction. These strands, the major understandings and their associated performance indicators are to be incorporated into lessons throughout the school year on an ongoing basis.</p>						
<p>MONTH: JANUARY - FEBRUARY</p>						
		<p>----- 1. How do we use a ruler? -----</p>				
5.M.2	Measurement	<p>Students will determine what can be measured and how, using appropriate methods and formulas. ----- 1. What are customary units of measure? -----</p>	<p>Units of Measurement ----- inch foot yard mile</p>	<ul style="list-style-type: none"> Identify customary equivalent units of length 	<ul style="list-style-type: none"> Measuring real world objects 	<ul style="list-style-type: none"> Class participation Homework Teacher observation
5.M.9	Measurement	<p>Students will develop strategies for estimating measurements. ----- 1. How and why do we estimate length? -----</p>	<p>Estimation ----- personal references</p>	<ul style="list-style-type: none"> Determine personal references for customary units of length (e.g., your pace is approximately 3 feet, your height is approximately 5 feet, etc.) 	<ul style="list-style-type: none"> Tape measure Guess and check 	<ul style="list-style-type: none"> Class participation Homework Teacher observation
5.M.6	Measurement	<p>Students will determine what can be measured and how, using appropriate methods and formulas. ----- 1. What are the most appropriate tools with which to measure? -----</p>	<p>Tools and Methods ----- protractor angle yard stick customary measurement system</p>	<ul style="list-style-type: none"> Determine the tool and technique to measure with an appropriate level of precision: lengths and angles 	<ul style="list-style-type: none"> Use various tools to measure same objects 	<ul style="list-style-type: none"> Class participation Homework Teacher observation
5.M.5	Measurement	<p>Students will determine what can be measured and how, using appropriate methods</p>	<p>Units of Measurement -----</p>	<ul style="list-style-type: none"> Convert measurement within a given 	<ul style="list-style-type: none"> Centimeters to meters Meters to centimeters Metric rulers 	<ul style="list-style-type: none"> Class participation Homework Teacher

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<p>The five process strands (problem solving, reasoning and proof, communication, connections and representations) are integral to instruction. These strands, the major understandings and their associated performance indicators are to be incorporated into lessons throughout the school year on an ongoing basis.</p>						
<p>MONTH: JANUARY - FEBRUARY</p>						
		<p>and formulas. ----- 1. How do I convert measurements?</p>	<p>metric system centimeter decimeter kilometer millimeter</p>	<p>system</p>		<p>observation</p>
5.M.11	Measurement	<p>Students will develop strategies for estimating measurements ----- 1. Why do we estimate? 2. What is estimation?</p>	<p>Estimation ----- reasonable estimates</p>	<ul style="list-style-type: none"> Justify the reasonableness of estimates 	<ul style="list-style-type: none"> Guess & check 	<ul style="list-style-type: none"> Class participation Homework Teacher observation
5.M.3	Measurement	<p>Students will determine what can be measured and how, using appropriate methods and formulas. ----- 1. What is the metric system?</p>	<p>Units of Measurement ----- metric system centimeter decimeter kilometer millimeter meter stick</p>	<ul style="list-style-type: none"> Measure to the nearest centimeter 	<ul style="list-style-type: none"> Use metric rulers 	<ul style="list-style-type: none"> Class participation Homework Teacher observation
5.M.10	Measurement	<p>Students will develop strategies for estimating measurements. ----- 1. What are the most appropriate tools with which to measure?</p>	<p>Estimation -----</p>	<ul style="list-style-type: none"> Determine personal references for metric units of length 	<ul style="list-style-type: none"> Metric rulers 	<ul style="list-style-type: none"> Class participation Homework Teacher observation
5.M.4	Measurement	<p>Students will determine what can be measured and how, using appropriate methods and formulas. -----</p>	<p>Units of Measurement -----</p>	<ul style="list-style-type: none"> Identify equivalent metric units of length 	<ul style="list-style-type: none"> Metric steps 	<ul style="list-style-type: none"> Class participation Homework Teacher observation

PI NUMBER	STRAND	MAJOR UNDERSTANDING ----- ESSENTIAL QUESTION	BAND/ TOPIC ----- VOCABULARY	SKILLS/ PERFORMANCE INDICATORS	SUGGESTIONS & ACTIVITIES	ASSESSMENTS:
<p>The five process strands (problem solving, reasoning and proof, communication, connections and representations) are integral to instruction. These strands, the major understandings and their associated performance indicators are to be incorporated into lessons throughout the school year on an ongoing basis.</p>						
<p>MONTH: JANUARY - FEBRUARY</p>						
		1. How do you find equivalent metric units of length?				
5.M.7	Measurement	Students will use units to give meaning to measurements ----- 1. How do I measure time?	Units ----- elapsed time	<ul style="list-style-type: none"> Calculate elapsed time in hours and minutes 	<ul style="list-style-type: none"> Plan a schedule 	<ul style="list-style-type: none"> Class participation Homework Teacher observation

PI NUMBER	STRAND	MAJOR UNDERSTANDING ----- ESSENTIAL QUESTION	BAND/TOPIC ----- VOCABULARY	SKILLS/PERFORMANCE INDICATORS	SUGGESTIONS & ACTIVITIES	ASSESSMENTS:
<p>The five process strands (problem solving, reasoning and proof, communication, connections and representations) are integral to instruction. These strands, the major understandings and their associated performance indicators are to be incorporated into lessons throughout the school year on an ongoing basis.</p>						
<p>MONTH: FEBRUARY - MARCH</p>						
5.G.1	Geometry	<p>Students will use visualization and spatial reasoning to analyze characteristics and properties of geometric shapes.</p> <p>-----</p> <ol style="list-style-type: none"> 1. What are polygons? 2. What is perimeter? 3. How do we calculate perimeter? 	<p>Shapes ----- perimeter polygon irregular polygon</p>	<ul style="list-style-type: none"> • Calculate the perimeter of regular and irregular polygons 	<ul style="list-style-type: none"> • Measure real world objects 	<ul style="list-style-type: none"> • Class participation • Homework • Teacher observation
5.A.6	Algebra	<p>Students will perform algebraic procedures accurately</p> <p>-----</p> <ol style="list-style-type: none"> 1. What is the formula for perimeter? 2. How do I use the formula to calculate perimeter? 	<p>Variables and Expressions ----- formula</p>	<ul style="list-style-type: none"> • Evaluate the perimeter formula for given input value 	<ul style="list-style-type: none"> • Use rulers to draw polygons with different lengths and widths 	<ul style="list-style-type: none"> • Perimeter Assessment Chapter 25
5.G.3	Geometry	<p>Students will identify and justify geometric relationships, formally and informally.</p> <p>-----</p> <ol style="list-style-type: none"> 1. What is a ratio? 	<p>Geometric Relationships ----- ratio corresponding sides comparison corresponding angles</p>	<ul style="list-style-type: none"> • Identify the ratio of corresponding sides of similar triangles 	<ul style="list-style-type: none"> • Overhead transparencies 	<ul style="list-style-type: none"> • Class participation • Homework • Teacher observation
5.N.6	Number Sense and Operations	<p>Students will understand numbers, multiple ways of representing numbers, relationships among numbers, and number systems</p>	<p>Number Systems ----- ratio</p>	<ul style="list-style-type: none"> • Understand the concept of ratio 	<ul style="list-style-type: none"> • 	<ul style="list-style-type: none"> • Class participation • Homework • Teacher observation

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<p>The five process strands (problem solving, reasoning and proof, communication, connections and representations) are integral to instruction. These strands, the major understandings and their associated performance indicators are to be incorporated into lessons throughout the school year on an ongoing basis.</p>						
<p>MONTH: FEBRUARY - MARCH</p>						
		----- 1. What is a ratio?				
5.N.7	Number Sense and Operations	Students will understand numbers, multiple ways of representing numbers, relationships among numbers, and number systems ----- 1. How do you express ratios in different forms?	Number Systems -----	<ul style="list-style-type: none"> Express ratios in different forms 	<ul style="list-style-type: none"> 	<ul style="list-style-type: none"> Ratios Assessment Chapter 28
5.N.11	Number Sense and Operations	Students will understand numbers, multiple ways of representing numbers, relationships among numbers, and number systems ----- 1. What is percent? 2. How are percents as fractions and decimals related?	Number Systems ----- percent	<ul style="list-style-type: none"> Understand that percent means part of 100, and write percents as fractions and decimals 	<ul style="list-style-type: none"> Pizza pieces Blocks, rods and cubes Money Fraction magnets Grades 	<ul style="list-style-type: none"> Class participation Homework Teacher observation
5.N.19	Number Sense and Operations	Students will understand meanings of operations and procedures, and how they relate to one another ----- 1. How and why do I simplify fractions? 2. What is lowest terms and simplest form?	Operations ----- simplest form lowest term	<ul style="list-style-type: none"> Simplify fractions to lowest terms 	<ul style="list-style-type: none"> Fraction bars 	<ul style="list-style-type: none"> Class participation Homework Teacher observation

PI NUMBER	STRAND	MAJOR UNDERSTANDING ----- ESSENTIAL QUESTION	BAND/TOPIC ----- VOCABULARY	SKILLS/PERFORMANCE INDICATORS	SUGGESTIONS & ACTIVITIES	ASSESSMENTS:
<p>The five process strands (problem solving, reasoning and proof, communication, connections and representations) are integral to instruction. These strands, the major understandings and their associated performance indicators are to be incorporated into lessons throughout the school year on an ongoing basis.</p>						
<p>MONTH: FEBRUARY - MARCH</p>						
5.N.7	Number Sense and Operations	Students will understand numbers, multiple ways of representing numbers, relationships among numbers, and number systems ----- 1. How do you express ratios in different forms?	Number Systems -----	<ul style="list-style-type: none"> • Express ratios in different forms 	<ul style="list-style-type: none"> • 	<ul style="list-style-type: none"> • Decimals and Percents Assessment Chapter 29

NEW YORK STATE MATHEMATICS ASSESSMENT

PI NUMBER	STRAND	MAJOR UNDERSTANDING ----- ESSENTIAL QUESTION	BAND/TOPIC ----- VOCABULARY	SKILLS/PERFORMANCE INDICATORS	SUGGESTIONS & ACTIVITIES	ASSESSMENTS:
<p>The five process strands (problem solving, reasoning and proof, communication, connections and representations) are integral to instruction. These strands, the major understandings and their associated performance indicators are to be incorporated into lessons throughout the school year on an ongoing basis.</p> <p>MONTH: MARCH - APRIL</p>						
5.A.2	Algebra	Students will represent and analyze algebraically a wide variety of problem solving situations. ----- 1. How do you write an algebraic expression from a verbal expression?	Variables and Expressions ----- symbols in verbal form symbols in written form	<ul style="list-style-type: none"> Translate simple verbal expressions into algebraic expressions 	<ul style="list-style-type: none"> Three less than x is $x-3$ Hands on equations 	<ul style="list-style-type: none"> Class participation Homework Teacher observation
5.A.3	Algebra	Students will perform algebraic procedures accurately ----- 1. How do we assign values and evaluate variable expressions?	Variables and Expressions ----- variable substitute substitution	<ul style="list-style-type: none"> Substitute assigned values into variable expressions and evaluate using order of operations 	<ul style="list-style-type: none"> $N=3$ and $a=2$ $5n+2a=$ _____ $(5 \times 3) + (2 \times 2) =$ _____ Hands on equations 	<ul style="list-style-type: none"> Class participation Homework Teacher observation
5.A.4	Algebra	Students will perform algebraic procedures accurately ----- 1. How do you solve simple one-step equations?	Equations and Inequalities ----- equations	<ul style="list-style-type: none"> Solve simple one-step equations using basic whole-number facts 	<ul style="list-style-type: none"> Hands on equations 	<ul style="list-style-type: none"> Class participation Homework Teacher observation
5.A.5	Algebra	Students will perform algebraic procedures accurately ----- 1. How do we solve simple one step equations using inverse operations?	Equations and Inequalities ----- inverse operations	<ul style="list-style-type: none"> Solve and explain simple one-step equations using inverse operations involving whole numbers 	<ul style="list-style-type: none"> Hands on equations 	<ul style="list-style-type: none"> Class participation Homework Teacher observation
5.N.9	Number Sense and Operations	Students will understand numbers, multiple ways of representing numbers, relationships among numbers,	Number Systems ----- inequality	<ul style="list-style-type: none"> Compare fractions using $<$, $>$, or $=$ 	<ul style="list-style-type: none"> Fraction Bars Magnet Bars Virtual Library 	<ul style="list-style-type: none"> Class participation Homework Teacher

PI NUMBER	STRAND	MAJOR UNDERSTANDING ----- ESSENTIAL QUESTION	BAND/TOPIC ----- VOCABULARY	SKILLS/PERFORMANCE INDICATORS	SUGGESTIONS & ACTIVITIES	ASSESSMENTS:
The five process strands (problem solving, reasoning and proof, communication, connections and representations) are integral to instruction. These strands, the major understandings and their associated performance indicators are to be incorporated into lessons throughout the school year on an ongoing basis.						
MONTH: MARCH - APRIL						
		and number systems ----- 1. How do we compare fractions?				observation
5.N.10	Number Sense and Operations	Students will understand numbers, multiple ways of representing numbers, relationships among numbers, and number systems ----- 1. How do we compare decimals?	Number Systems ----- inequality	<ul style="list-style-type: none"> Compare decimals using $<$, $>$, or $=$ 	<ul style="list-style-type: none"> Use manipulatives to make visual comparisons 	<ul style="list-style-type: none"> Writing and Solving Equations Assessment Chapter 4

PI NUMBER	STRAND	MAJOR UNDERSTANDING ----- ESSENTIAL QUESTION	BAND/TOPIC ----- VOCABULARY	SKILLS/ PERFORMANCE INDICATORS	SUGGESTIONS & ACTIVITIES	ASSESSMENTS:
<p>The five process strands (problem solving, reasoning and proof, communication, connections and representations) are integral to instruction. These strands, the major understandings and their associated performance indicators are to be incorporated into lessons throughout the school year on an ongoing basis.</p>						
<p>MONTH: APRIL - MAY</p>						
5.G.12	Geometry	Students will apply coordinate geometry to analyze problem solving situations ----- 1. What is the coordinate plane?	Coordinate Geometry ----- quadrant plot axis/axes	<ul style="list-style-type: none"> Identify and plot points in the first quadrant 	<ul style="list-style-type: none"> Graph/Grid paper 	<ul style="list-style-type: none"> Class participation Homework Teacher observation
5.G.13	Geometry	Students will apply coordinate geometry to analyze problem solving situations ----- 1. How do we plot points on a coordinate plane?	Coordinate Geometry -----	<ul style="list-style-type: none"> Plot points to form basic geometric shapes (identify and classify) 	<ul style="list-style-type: none"> Graph/Grid paper 	<ul style="list-style-type: none"> Class participation Homework Teacher observation
5.S.1	Statistics and Probability	Students will collect, organize, display, and analyze data ----- 1. How and why do I collect and record data?	Collection of Data ----- data	<ul style="list-style-type: none"> Collect and record data from a variety of sources (e.g., newspapers, magazines, polls, charts, and surveys) 	<ul style="list-style-type: none"> Class/survey related to social studies (i.e. population, geographic location) 	<ul style="list-style-type: none"> Ordered Pairs Assessment Chapter 6

PI NUMBER	STRAND	MAJOR UNDERSTANDING ----- ESSENTIAL QUESTION	BAND/TOPIC ----- VOCABULARY	SKILLS/PERFORMANCE INDICATORS	SUGGESTIONS & ACTIVITIES	ASSESSMENTS:
The five process strands (problem solving, reasoning and proof, communication, connections and representations) are integral to instruction. These strands, the major understandings and their associated performance indicators are to be incorporated into lessons throughout the school year on an ongoing basis.						
MONTH: MAY-JUNE						
5.A.2	Algebra	Students will represent and analyze algebraically a wide variety of problem solving situations. ----- 1. How do you write an algebraic expression from a verbal expression?	Variables and Expressions ----- symbols in verbal form symbols in written form	<ul style="list-style-type: none"> Translate simple verbal expressions into algebraic expressions 	<ul style="list-style-type: none"> Three less than x is $x-3$ Hands on equations 	<ul style="list-style-type: none"> Class participation Homework Teacher observation
5.A.3	Algebra	Students will perform algebraic procedures accurately ----- 1. How do we assign values and evaluate variable expressions?	Variables and Expressions ----- variable substitute substitution	<ul style="list-style-type: none"> Substitute assigned values into variable expressions and evaluate using order of operations 	<ul style="list-style-type: none"> $N=3$ and $a=2$ $5n+2a=$ _____ $(5 \times 3) + (2 \times 2) =$ _____ Hands on equations 	<ul style="list-style-type: none"> Class participation Homework Teacher observation
5.A.4	Algebra	Students will perform algebraic procedures accurately ----- 1. How do you solve simple one-step equations?	Equations and Inequalities ----- equations	<ul style="list-style-type: none"> Solve simple one-step equations using basic whole-number facts 	<ul style="list-style-type: none"> Hands on equations 	<ul style="list-style-type: none"> Class participation Homework Teacher observation
5.A.5	Algebra	Students will perform algebraic procedures accurately ----- 1. How do we solve simple one step equations using inverse operations?	Equations and Inequalities ----- inverse operations	<ul style="list-style-type: none"> Solve and explain simple one-step equations using inverse operations involving whole numbers 	<ul style="list-style-type: none"> Hands on equations 	<ul style="list-style-type: none"> Expressions and Equations Assessment Chapter 12
5.S.5	Statistics and Probability	Students will understand and apply concepts of probability ----- 1. What are my chances?	Probability ----- possible outcomes	<ul style="list-style-type: none"> List the possible outcomes for a single-event experiment 	<ul style="list-style-type: none"> Pull marbles or tiles from a bin 	<ul style="list-style-type: none"> Class participation Homework Teacher

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<p>MONTH: MAY-JUNE</p>						
		2. What is a possible outcome?	probability single event experiment			observation
5.S.6	Statistics and Probability	Students will understand and apply concepts of probability ----- 1. How do we record possible outcomes?	Probability -----	<ul style="list-style-type: none"> Record experiment results using fractions/ratios 	<ul style="list-style-type: none"> Manipulatives 	<ul style="list-style-type: none"> Class participation Homework Teacher observation
5.S.7	Statistics and Probability	Students will understand and apply concepts of probability ----- 1. What are my chances?	Probability ----- Sample space	<ul style="list-style-type: none"> Create a sample space and determine the probability of a single event, given a simple experiment (e.g., rolling a number cube) 	<ul style="list-style-type: none"> Dice games 	<ul style="list-style-type: none"> Probability Assessment Chapter 30
5. PS.1	Problem Solving	Students will build new mathematical knowledge through problem solving ----- 1. What is relevant and irrelevant information?	----- relevant irrelevant	<ul style="list-style-type: none"> Know the difference between relevant and irrelevant information when solving problems 	<ul style="list-style-type: none"> Cooperative group activity 	<ul style="list-style-type: none"> Class participation Homework Teacher observation
5. PS.4	Problem Solving	Students will solve problems that arise in mathematics and in other contexts -----	-----	<ul style="list-style-type: none"> Act our or model with manipulatives activities involving mathematical content from literature 	<ul style="list-style-type: none"> Overhead projector manipulatives 	<ul style="list-style-type: none"> Class participation Homework Teacher observation

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5. PS.10	Problem Solving	Students will apply and adapt a variety of appropriate strategies to solve problems ----- 1. What are different strategies I can use to solve mathematical problems?	----- strategy	<ul style="list-style-type: none"> Work in collaboration with others to solve problems 	<ul style="list-style-type: none"> Cooperative learning activities 	<ul style="list-style-type: none"> Class participation Homework Teacher observation
5. PS.12	Problem Solving	Students will apply and adapt a variety of appropriate strategies to solve problems ----- 1. What are different strategies I can use to solve mathematical problems?	----- strategy	<ul style="list-style-type: none"> Use trial and error and the process of elimination to solve problems 	<ul style="list-style-type: none"> Guess and check 	<ul style="list-style-type: none"> Class participation Homework Teacher observation
5. PS.16	Problem Solving	Students will monitor and reflect on the process of mathematical problem solving ----- 1. What are different strategies I can use to solve mathematical problems?	----- strategy	<ul style="list-style-type: none"> Discuss with peers to understand a problem situation 	<ul style="list-style-type: none"> Pair-share 	<ul style="list-style-type: none"> Class participation Homework Teacher observation
5. PS.20	Problem Solving	Students will monitor and reflect on the process of mathematical problem solving -----	----- counter examples	<ul style="list-style-type: none"> Understand valid counter examples 	<ul style="list-style-type: none"> Cooperative learning activities 	<ul style="list-style-type: none"> Class participation Homework Teacher observation
5.PS.21	Problem Solving	Students will monitor and reflect on the process of mathematical problem solving -----	----- strategy	<ul style="list-style-type: none"> Explain the methods and reasoning behind the problem solving strategies used 	<ul style="list-style-type: none"> Group work with reporting out Write mathematically 	<ul style="list-style-type: none"> Class participation Homework Teacher observation

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<p>The five process strands (problem solving, reasoning and proof, communication, connections and representations) are integral to instruction. These strands, the major understandings and their associated performance indicators are to be incorporated into lessons throughout the school year on an ongoing basis.</p>						
<p>MONTH: MAY-JUNE</p>						
5.PS.22	Problem Solving	Students will monitor and reflect on the process of mathematical problem solving -----	----- reasonable	<ul style="list-style-type: none"> Discuss whether a solution is reasonable in the context of the original problem 	<ul style="list-style-type: none"> Cooperative learning activities 	<ul style="list-style-type: none"> Class participation Homework Teacher observation
5.PS.23	Problem Solving	Students will monitor and reflect on the process of mathematical problem solving -----	----- verify	<ul style="list-style-type: none"> Verify results of a problem 	<ul style="list-style-type: none"> Pair-share 	<ul style="list-style-type: none"> Class participation Homework Teacher observation

COURSE: Math
GRADE LEVEL: 6

Revised 6/29/12

MAIN/GENERAL TOPIC:	SUB-TOPIC:	STRAND/PI	WHAT THE STUDENTS WILL KNOW OR BE ABLE TO DO:	AMOUNT OF TIME (DAYS)	ASSESSMENTS:
RATIO AND PROPORTIONAL RELATIONSHIPS	Understanding ratios and rates	6.RP.1 6.RP.2	<ul style="list-style-type: none"> Understand the concept of a ratio and use ratio language to describe a ratio relationship between two quantities. Understand the concept of a unit rate a/b associated with a ratio $a:b$ with b not equal to 0 and use rate language in the context of a ratio relationship. 	12	<ul style="list-style-type: none"> Homework Quizzes Unit tests
RATIO AND PROPORTIONAL RELATIONSHIPS	Application of Ratios and Rates	6.RP.3 a, b, d	<ul style="list-style-type: none"> Use ratio and rate reasoning to solve real world and mathematical problems. Use tables of equivalent ratios relating quantities with whole-number measurements, find missing values in the tables, and plot the pairs of values on the coordinate plane. Use tables to compare ratios. Solve unit rate problems including those involving unit pricing and constant speed. Use ratio reasoning to convert measurement units; manipulate and transform units appropriately when multiplying or dividing quantities. 	12	<ul style="list-style-type: none"> Homework Quizzes Unit tests
NUMBER SYSTEM	Multi-digit computation and finding common factors of multiples	6.NS.2 6.NS.3 6.NS.4 6.EE.3	<ul style="list-style-type: none"> Fluently divide multi-digit numbers using the standard algorithm. Fluently add, subtract, multiply and divide multi-digit decimals using the standard algorithm for each operation. Find the greatest common factor of two whole numbers less than or equal to 100 and the least common multiple of two whole numbers less than or equal 	12	<ul style="list-style-type: none"> Homework Quizzes Unit tests

			<p>to 12. Use the distributive property to express a sum of two whole numbers 1-100 with a common factor as a multiple of a sum of two whole numbers with no common factor.</p> <ul style="list-style-type: none"> • Apply the properties of operations to generate equivalent expressions. (distributive) 		
NUMBER SYSTEM	Dividing Fractions	6.NS.1	<ul style="list-style-type: none"> • Interpret and compute quotients of fractions, and solve word problems involving division of fractions by fractions. 	7	<ul style="list-style-type: none"> • Homework • Quizzes • Unit tests
RATIO AND PROPORTIONAL RELATIONSHIPS	Reasoning Proportionally with Percents	6.RP.3c	<ul style="list-style-type: none"> • Find the percent of a quantity as a rate per 100 • Solve problems involving finding the whole, given a part and the percent. 	12	<ul style="list-style-type: none"> • Homework • Quizzes • Unit tests
NUMBER SYSTEM	Extending the Number System	6.NS.5 6.NS.6a	<ul style="list-style-type: none"> • Understand the positive and negative numbers are used together to describe quantities having opposite directions or values • Recognize opposite signs of numbers as indicating locations on opposite sides of 0 on the number line. • Recognize that the opposite of a number is the number itself 	10	<ul style="list-style-type: none"> • Homework • Quizzes • Unit tests
NUMBER SYSTEM	Absolute Value and ordering rational numbers	6.NS.7 a, b, c, d	<ul style="list-style-type: none"> • Understand ordering and absolute value of rational numbers • Interpret statements of inequality as statements about the relative position of two numbers on a number line diagram • Write, interpret, and explain statements of order for rational numbers in real-world contexts. • Understand the absolute value of a rational number as its distance from 0 on the number line, interpret absolute value as magnitude for a positive or negative quantity in a real-world situation. 	7	<ul style="list-style-type: none"> • Homework • Quizzes • Unit tests

			<ul style="list-style-type: none"> Distinguish comparisons of absolute value from statements about order. 		
NUMBER SYSTEM	Relationships in the Coordinate Plane	6.NS.6 b,c	<ul style="list-style-type: none"> Understand signs of numbers in ordered pairs as indicating locations in quadrants of the coordinate plane; recognize that when two ordered pairs differ only by signs, the locations of the points are related by reflections across one or both axes. Find and position integers and other rational numbers on a horizontal or vertical number line diagram; find and position pairs of integers and other rational numbers on a coordinate plane. Solve real-world and mathematical problems by graphing points in all four quadrants of a coordinate plane. Include use of coordinates and absolute value to find distances between points with the same first coordinate or same second coordinate. Draw polygons in the coordinate plane given coordinates for the vertices; use coordinates to find the length of a side joining points with the same first coordinate or the same second coordinate. Apply these techniques in the context of solving real-world and mathematical problems. 	10	<ul style="list-style-type: none"> Homework Quizzes Unit tests
STATISTICS AND PROBABILITY	Data Distributions	6.SP.1 6.SP.2 6.SP.3	<ul style="list-style-type: none"> Recognize a statistical question as one that anticipates variability in the data related to the question and accounts for it in the answers. Understand that a set of data collected to answer a statistical question has a distribution which can be described by its center, spread, and overall shape. Recognize that a measure of center for a numerical data set summarizes all of 	10	<ul style="list-style-type: none"> Homework Quizzes Unit tests

			its values with a single number, while a measure of variation describes how its values vary with a single number.		
STATISTICS AND PROBABILITY	Analyzing Data	6.SP.4 6.SP.5 a, b,c,d	<ul style="list-style-type: none"> • Display numerical data in plots on a number line, including dot plots, histograms, and box plots • Summarize numerical data sets in relation to their context, such as by: <ul style="list-style-type: none"> a. Reporting the number of observations. b. Describing the nature of the attribute under investigation, including how it was measured and its units of measurement c. Giving quantitative measure of center (median and/or mean) and variability, as well as describing any overall pattern and any striking deviations from the overall pattern with reference to the context in which the data were gathered. d. Relating the choice of measures of center and variability to the shape of the data distribution and the context in which the data were gathered. 	10	<ul style="list-style-type: none"> • Homework • Quizzes • Unit tests
GEOMETRY	Problem Solving with area in 2-D shapes	6.G.1	<ul style="list-style-type: none"> • Find the area of right triangles, other triangles, special quadrilaterals, and polygons by composing into rectangles and decomposing into triangles and other shapes; apply these techniques in the context of solving real-world and mathematical problems. 	10	<ul style="list-style-type: none"> • Homework • Quizzes • Unit tests
GEOMETRY	Problem Solving with Volume and Surface Area	6.G.2	<ul style="list-style-type: none"> • Find the volume of a right rectangular prism with fractional edge lengths by packing it with unit cubes of the appropriate unit fraction edge lengths, and show that the volume is the same as would be found by multiplying the 	10	<ul style="list-style-type: none"> • Homework • Quizzes • Unit tests

			<p>edge lengths of the prism. Apply the formulas $V=lw$ and $V=bh$ to find volumes of right rectangular prisms with fractional edge lengths in the context of solving real-world and mathematical problems.</p> <ul style="list-style-type: none"> • Represent three-dimensional figures using nets made up of rectangles and triangles, and use the nets to find the surface area of these figures. Apply these techniques in the context of solving real-world and mathematical problems. 		
EQUATIONS AND EXPRESSIONS	Relationships among Variables	6.EE.9	<ul style="list-style-type: none"> • Use variables to represent two quantities in a real-world problem that change in relationship to one another; write an equation to express one quantity, thought of as the dependent variable, in terms of the other quantity, thought of as the independent variable. Analyze the relationship between the dependent and independent variables using graphs and tables, and relate these to the equation. 	8	<ul style="list-style-type: none"> • Homework • Quizzes • Unit tests
EQUATIONS AND EXPRESSIONS	Algebraic Expressions	6.EE.1 6.EE.2 a, b, c 6.EE.3 6.EE.4	<ul style="list-style-type: none"> • Write and evaluate numerical expressions involving whole-number exponents. • Write, read, and evaluate expression in which letters stand for numbers. <ul style="list-style-type: none"> a. Write expressions that record operations with numbers and with letters standing for numbers. b. Identify parts of an expression using mathematical terms (sum, term, product, factor, quotient, coefficient); view one or more parts of an expression as a single entity. c. Evaluate expressions at specific values and variables. Include expressions that arise from 	10	<ul style="list-style-type: none"> • Homework • Quizzes • Unit tests

			<p>formulas used in real-world problems. Perform arithmetic operations, including those involving whole-number exponents, in the conventional order when there are no parentheses to specify a particular order.</p> <ul style="list-style-type: none"> • Apply the properties of operations to generate equivalent expressions. • Identify when two expressions are equivalent. 		
EXPRESSIONS AND EQUATIONS	Understanding Equations and Inequalities	6.EE.5 6.EE.6	<ul style="list-style-type: none"> • Understand solving an equation or inequality as a process of answering a question: which values from a specified set, if any, make the equation or inequality true? Use substitution to determine whether a given number in a specified set makes an equation or inequality true. • Use variables to represent numbers and write expressions when solving a real-world or mathematical problem; understand that a variable can represent an unknown number, or, depending on the purpose at hand, any number in a specified set. 	8	<ul style="list-style-type: none"> • Homework • Quizzes • Unit tests
EQUATIONS AND EXPRESSIONS	Writing and Solving Equations and Inequalities	6.EE.7 6.EE.8	<ul style="list-style-type: none"> • Solve real-world and mathematical problems by writing and solving equations of the form $x + p = q$ and $px = q$ for cases in which p, q, and x are all nonnegative rational numbers. • Write an inequality of the form $x > c$ or $x < c$ to represent a constraint or condition in a real-world or mathematical problem. Recognize that inequalities of the form $x > c$ or $x < c$ have infinitely many solutions; represent solutions of such inequalities on number line diagrams. 	12	<ul style="list-style-type: none"> • Homework • Quizzes • Unit tests

COURSE: Math
GRADE LEVEL: 7R

Course Instructors: Mulcahy & Nastke
 Revised: June 2010

MAIN/GENERAL TOPIC:	SUB-TOPIC:	ESSENTIAL QUESTIONS:	STRAND/PI	WHAT THE STUDENTS WILL KNOW OR BE ABLE TO DO:	WHEN STUDENT DOES IT:	ASSESSMENTS:
NUMBER AND NUMERATION	The Real Number System	<ul style="list-style-type: none"> How are real numbers used in our world? How do you classify real numbers? How are real numbers ordered on a number line? 	7.N.1 7.N.2 7.N.3 7.N.15 7.N.16 7.N.17 7.N.18 7.N.19	<ul style="list-style-type: none"> Identify place value Classify subsets within the real number system Order real numbers on a number line Estimate the square root of a non-perfect square 	September	<ul style="list-style-type: none"> Inventory test Venn Diagram Cooperative Learning Weekend Assignments Unit Exam
NUMBER AND NUMERATION	Number Theory	<ul style="list-style-type: none"> What contributions did Eratosthenes make to Math? How do you find the GCF and LCM of two or more numbers? How do you find the prime factorization of a given number? What are the laws of exponents? How is scientific notation used? 	7.N.4 7.N.8 7.N.9 7.N.10 7.N.5 7.N.6 7.N.7 7.N.14	<ul style="list-style-type: none"> How to identify prime and composite numbers (also including zero and one) How to find GCF and LCM using two methods (listing and prime factorization) How to multiply and divide using the laws of exponents How to convert from scientific notation to standard form and vice versa How to order numbers written in scientific notation 	September – October	<ul style="list-style-type: none"> GCF/LCM quiz Scientific notation quiz Planet activity Newspaper activity Weekend assignments Unit Exam
NUMBER AND NUMERATION	Operations	<ul style="list-style-type: none"> How are integers used in our world? What are the order of operations? 	7.N.11 7.N.12 7.N.13	<ul style="list-style-type: none"> How to add, subtract, multiply and divide integers How to use a number line to aid in adding and subtracting integers Be able to identify properties Simplify expressions using order of operations 	October – November	<ul style="list-style-type: none"> Integers quiz Number line activity Weekend assignments Unit test

PROBABILITY	Probability	<ul style="list-style-type: none"> • What is probability? 	7.S.8 7.S.9 7.S.10 7.S.11 7.S.12 6.A.5	<ul style="list-style-type: none"> • Interpret data to predict and establish probability • Determine validity of samples • Predict the experimental outcomes • Design and conduct an experiment • Compare results to predicted results • Solve simple proportions within context (predicting results) 	November	<ul style="list-style-type: none"> • Spinner Game Activity • Weekend Assignments • Rock, Paper, Scissors Lab • Unit Exam
MEASUREMENT	Units of Measurement	<ul style="list-style-type: none"> • How do the metric and customary systems of measurement compare? • How can you convert measures within a given system? 	7.M.2 7.M.3 7.M.4 7.M.8	<ul style="list-style-type: none"> • Convert capacities and volumes within a given system • Identify customary and metric units of mass • Convert mass within a given system 	November - December	<ul style="list-style-type: none"> • Pizza Problem • Weekend Assignments • Midterm (Benchmark #2)
MEASUREMENT	Tools, Methods, and Estimation	<ul style="list-style-type: none"> • What tools are needed for the job? 	7.M.9 7.M.10 7.M.11 7.M.12 7.M.13	<ul style="list-style-type: none"> • Choose a tool and technique for measure mass appropriately • Identify the relationship between relative error and magnitude (large numbers of populations and money) • Estimate surface area • Estimate the mass of an object using a personal reference 	December	<ul style="list-style-type: none"> • Weekend Assignment • Weight Lab • Unit Test
ALGEBRA	Variables, expressions, and equations	<ul style="list-style-type: none"> • How do you translate verbal to algebraic expressions? • How do you solve two-step equations? • How do you explain your process in solving equations? 	7.A.1 6.A.4 7.A.2 7.A.3 7.A.4	<ul style="list-style-type: none"> • Translate two-step verbal sentences into algebraic equations. • Solve and explain two-step equations • Add and subtract monomials with exponents of one • Identify a polynomial as an algebraic expression containing one or more terms • Solve multi-step equations by combining like terms, using distributive property, or moving 	January	<ul style="list-style-type: none"> • Translating quiz • Equations quiz • Weekend assignments • Unit test

				variables to one side of the equation		
ALGEBRA	Proportions, Inequalities, and Formulas	<ul style="list-style-type: none"> How do you identify when a proportion is needed? How do you solve a proportion? How do you solve and graph an inequality 	6.A.5 7.A.5 7.G.10 7.A.6	<ul style="list-style-type: none"> Apply simple proportions within context Solve and graph one-step inequalities (with positive coefficients) Evaluate formulas 	January	<ul style="list-style-type: none"> Proportions Quiz Cooperative learning with graphs Weekend assignments Unit Test
ALGEBRA	Patterns, Relations, and Functions	<ul style="list-style-type: none"> How do you plot points on a coordinate plane? How do you graph a pattern? How do you write an equation from a table of values? 	6.G.10 7.A.7 7.A.8 7.A.10	<ul style="list-style-type: none"> Identify and plot points in all four quadrants Draw the graphic representation of a pattern from an equation or from a data table Create algebraic patterns using charts/tables, graphs, equations, and expressions Write an equation to represent a function from a table of values 	February	<ul style="list-style-type: none"> Simpsons Quiz Snowmobile activities Unit Test
STATISTICS	Statistics Analysis of Data	<ul style="list-style-type: none"> What are the measures of central tendency? How do you calculate range? How do you select the appropriate measure of central tendency? How do you read and interpret data represented graphically? 	7.S.4 7.S.5 7.S.6	<ul style="list-style-type: none"> Calculate range Select the appropriate measure of central tendency Read and interpret data represented graphically 	February – March	<ul style="list-style-type: none"> Weekend Assignments Unit Test
STATISTICS	Statistics Data: Collection, Organization and Display	<ul style="list-style-type: none"> How do you collect and display data? What is a misleading graph? 	7.S.1 7.S.3 6.S.1 6.S.2 6.S.3 6.S.4 6.A.5 7.S.7	<ul style="list-style-type: none"> Identify and collect data Convert raw data into double bar and double line graphs Record data in frequency table Construct Venn Diagrams Determine and justify the most appropriate graph to display data Identify and explain misleading 	March	<ul style="list-style-type: none"> Data collection/display assignment Weekend assignments Unit Exam

				statistics and graphs		
STATISTICS	Statistics Analysis of Data	<ul style="list-style-type: none"> • What are the measures of central tendency? • How do you calculate range? • How do you select the appropriate measure of central tendency? • How do you read and interpret data represented graphically? 	7.S.4 7.S.5 7.S.6	<ul style="list-style-type: none"> • Calculate range • Select the appropriate measure of central tendency • Read and interpret data represented graphically 	February – March	<ul style="list-style-type: none"> • Weekend Assignments • Unit Test
STATISTICS	Statistics Circle Graph	<ul style="list-style-type: none"> • How do you construct a circle graph? 	7.S.2 6.A.5 7.M.8	<ul style="list-style-type: none"> • Display data in a circle graph • Apply simple proportions within context • Circle Graphs (draw central angles in a given circle using a protractor) 	March	<ul style="list-style-type: none"> • Create circle graph using hours in a school day • Circle graph quiz
GEOMETRY	Shapes and Relationships (2 dimensional)	<ul style="list-style-type: none"> • What is area? • Using the given formulas for circles, how do you find the missing variables? • How can the number of degrees in a quadrilateral be determined? 	7.G.1 7.G.5 7.G.6 7.G.8 7.G.9 7.G.7	<ul style="list-style-type: none"> • Calculate the radius or diameter of a circle given the circumference or area • Identify the properties of a right triangle • Explore the relationship between the lengths of the three sides of a right triangle to develop the Pythagorean theorem • Find the missing side of a right triangle given 2 sides • Determine whether a given triangle is a right triangle (using Pythagorean theorem and a calculator) • Find a missing angle when given angles of a quadrilateral 	March - April	<ul style="list-style-type: none"> • Circumference discovery • Weekend Assignment • Quadrilateral SMARTBoard activity • Unit Exam

GEOMETRY	Shapes and Relationships (3 dimensional figures)	<ul style="list-style-type: none"> How do you identify three-dimensional shapes? What is surface area? What is volume? 	7.G.3 7.A.6 7.G.4 7.M.11 7.G.2	<ul style="list-style-type: none"> Estimate surface area Identify the 2-dimensional shapes that comprise 3-dimensional figures Determine the surface area of prisms and cylinders Calculate the volume of prisms and cylinders 	April - May	<ul style="list-style-type: none"> Construction of Nets Weekend Assignments Geometry Book Javier Builds a Model Activity Unit Test
NY STATE ASSESSMENT REVIEW	All Sept-April 7 th Grade Topics and May-June 6 th Grade Topics	•		•	May	• NY State 7 th Grade Math Assessment
MEASUREMENT	Units of Measurement	<ul style="list-style-type: none"> How is unit rate a life skill? 	7.M.1 7.M.5 7.M.6 7.M.7	<ul style="list-style-type: none"> Calculate distance using a map scale Calculate unit price using proportions Compare unit prices Convert money between different currencies 	May	<ul style="list-style-type: none"> Map Activity Grocery Store Activity Map Scale Packet Weekend Assignment Unit Exam
ALGEBRA	Patterns, Relations, and Functions	<ul style="list-style-type: none"> How do you write an equation from a table of values? How do you use patterns to find the angles of a polygon? 	7.A.10 7.A.9	<ul style="list-style-type: none"> Build a pattern to determine the sum of the interior angles of polygons Write an equation to represent a function 	May - June	<ul style="list-style-type: none"> XY encounter video series Smartboard Activity Weekend Assignment Unit Exam
ALGEBRA	Variables, Expressions, and Equations Integers	<ul style="list-style-type: none"> What is a polynomial? How do you solve multi-step equations? How do we use integers when solving equations? 	7.A.2 7.A.3 7.A.4 7.N.11 7.N.12 7.N.13	<ul style="list-style-type: none"> Add and subtract monomials with exponents of one Identify a polynomial Solve Multi-Step Equations Combining like terms Use distributive property Move variables to one side of the equation How to add, subtract, multiply, and divide integers within the context of solving equations Use a number line to aid in adding and subtracting integers 	June	<ul style="list-style-type: none"> Equations quiz Weekend Assignments Integer Puzzle Unit Test

REVIEW FOR MATH 7 FINAL ASSESSMENT		•		• Be able to apply their 7 th grade math knowledge to travel using a webquest that reviews all topics	June	• The Amazing Race Webquest
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COURSE: Math
GRADE LEVEL: 7-8-9 Year 1 (of a 2 year accelerated program)

Devlin/Anderson

MAIN/GENERAL TOPIC:	essential question:	Performance Indicators:	when:	assessments:
unit 1: operations with integers	<ul style="list-style-type: none"> What are the rules for operations with integers? 	<ul style="list-style-type: none"> 7.N.12 Add, subtract, multiply, and divide integers 7.N.13 Add and subtract two integers (with and without the use of a number line) 7.A.2 Add and subtract monomials with exponents of one 	September	<ul style="list-style-type: none"> Unit 1 Exam Weekly take home quizzes Quarterly benchmark exams
unit 2: solving equations	<ul style="list-style-type: none"> How do you solve equations? 	<ul style="list-style-type: none"> 7.A.4 Solve multi-step equations by combining like terms, using the distributive property, or moving variables to one side of the equation A.A.3 Distinguish the difference between an algebraic expression and an algebraic equation A.A.22 Solve all types of linear equations in one variable 	September	<ul style="list-style-type: none"> Unit 2 Exam Weekly take home quizzes Quarterly benchmark exams
unit 3: measurement	<ul style="list-style-type: none"> How do you convert from one system of measure to another? 	<ul style="list-style-type: none"> 5.M.9 Determine personal references for customary units of length (e.g., your pace is approx. 3 ft., your height is approx. 5 ft.) 5.M.10 Determine personal references for metric units of length 5.M.11 Justify the reasonableness of estimates 7.M.1 Calculate distance using a map scale 7.M.5 Calculate unit price using proportions 7.M.6 Compare unit prices 7.M.7 Convert money between different currencies with the 	October	<ul style="list-style-type: none"> Unit 3 Exam Weekly take home quizzes Quarterly benchmark exams

		<p>use of an exchange rate table and a calculator</p> <ul style="list-style-type: none"> • 7.M.9 Determine the tool and technique to measure with an appropriate level of precision: Mass • 7.M.12 Determine personal references for customary/metric units of Mass • 7.M.13 Justify the reasonableness of the mass of an object • 8.M.1 Solve equations/proportions to convert to equivalent measurements within metric and customary measurement systems. Note: Also allow Fahrenheit to Celsius and vice-versa. • A.M.2 Solve problems involving conversions within measurement systems, given the relationship between the units 		
unit 4: geometric shapes	<ul style="list-style-type: none"> • How do you calculate perimeter, area, surface area, and volume of geometric figures? 	<ul style="list-style-type: none"> • 5.G.14 Calculate perimeter of basic geometric shapes drawn on a coordinate plane (rectangles and shapes composed of rectangles having sides with integer lengths and parallel to the axis) • 6.G.5 Identify radius, diameter, chords, and central angles of a circle • 6.G.6 Understand the relationship between the diameter and radius of a circle • 6.G.7 Determine the area and circumference of a circle, using the appropriate formula • 6.G.8 Calculate the area of a sector of a circle, given the measure 	October /November	<ul style="list-style-type: none"> • Unit 4 Exam • Weekly take home quizzes • Quarterly benchmark exams

		<p>of a central angle and the radius of a circle</p> <ul style="list-style-type: none"> • 6.G.9 Understand the relationship between the circumference and the diameter of a circle • 7.G.1 Calculate the radius or diameter, given the circumference or area of a circle • 7.G.2 Calculate the volume of prisms and cylinders using a given formula and a calculator • 7.G.3 Identify the two dimensional shapes that make up the faces and bases of three dimensional shapes (prisms, cylinders, cones, pyramids) • 7.G.4 Determine the surface area of prisms and cylinders, using a calculator and a variety of methods • 7.M.10 Identify the relationship between relative error and magnitude when dealing with large numbers (e.g., money, population) • 7.M.11 Estimate surface area • A.G.1 Find the area and/or perimeter of figures composed of polygons and circles or sectors of a circle • A.M.3 Calculate the relative error in measuring square and cubic units, when there is an error in the linear measure 		
unit 5: geometric relationships	<ul style="list-style-type: none"> • How do I use relationships to find angle measures? 	<ul style="list-style-type: none"> • 8.G.1 Identify pairs of vertical angles as congruent. • 8.G.2 Identify pairs of supplementary and complementary angles. • 8.G.3 Calculate the missing angle in a supplementary or complementary pair. • 8.G.4 Determine angle pair relationship when given two parallel lines cut by a transversal. • 8.G.5 Calculate the missing angle measurements when given two parallel lines cut by a transversal. • 8.G.6 Calculate the missing angle measurements when given two intersecting lines and an angle. 	November	<ul style="list-style-type: none"> • Unit 5 Exam • Weekly take home quizzes • Quarterly benchmark exams

		<ul style="list-style-type: none"> • 8.A.12 Apply algebra to determine the measure of angles formed by or contained in parallel lines cut by a transversal and by intersecting lines. 		
unit 6: percent	<ul style="list-style-type: none"> • How is percent calculated? 	<ul style="list-style-type: none"> • 6.N.20 Represent fractions as terminating or repeating Decimals • 6.N.21 Find multiple representations of rational numbers (fractions, decimals, and percents (0-100) • 7.N.19 Justify the reasonableness of answers using estimation • 8.N.3 Read, write, and identify percents less than 1% and greater than 100% • 8.N.4 apply percents to: tax, percent increase/decrease, simple interest, sale price, commission, interest rates and gratuities • 8.N.5 Estimate a percent of a quantity, given an application 	December	<ul style="list-style-type: none"> • Unit 6 Exam • Weekly take home quizzes • Quarterly benchmark exams
unit 7: inequalities	<ul style="list-style-type: none"> • What are inequalities? 	<ul style="list-style-type: none"> • 7.A.5 Solve one-step inequalities (positive coefficients only), 2-step with negative coefficients • 7.G.10 Graph the solution set of an inequality on a number line • 8.A.13 Solve multi-step inequalities and graph the solution on a number line • 8.A.14 Solve linear inequalities by combining like terms, using the distributive property, or moving variables to one side of the inequality (include multiplication or division of inequalities by a negative number) • 8.G.19 Graph the solution set of an inequality on a number line • A.A.21 Determine whether a given value is a solution to a given linear equation in one variable or linear inequality in one variable • A.A.24 Solve linear inequalities in one variable 	December	<ul style="list-style-type: none"> • Unit 7 Exam • Weekly take home quizzes • Quarterly benchmark exams
unit 8: verbal to algebraic	<ul style="list-style-type: none"> • How do I convert from verbal to algebraic 	<ul style="list-style-type: none"> • 7.A.1 translate two step verbal expressions into algebraic expressions • 8.A.1 translate verbal sentences into algebraic inequalities 	January	<ul style="list-style-type: none"> • Unit 8 Exam • Weekly take

	language?	<ul style="list-style-type: none"> • 8.A.2 write verbal expressions that match given mathematical expressions • A.A.4 translate verbal sentences into mathematical equations or inequalities 		<p>home quizzes</p> <ul style="list-style-type: none"> • Quarterly benchmark exams
unit 9: Probability	<ul style="list-style-type: none"> • How is probability determined? 	<ul style="list-style-type: none"> • 5.S.5 list the possible outcomes for a single event experiment • 5.S.6 record experiment results using fractions/ratios • 5.S.7 create a sample space and determine the probability of a single event, given a simple experiment (e.g., rolling a number cube) • 6.S.9 list possible outcomes for compound events • 6.S.10 determine the probability of dependent events • 6.S.11 determine the number of possible outcomes for a compound event by using the fundamental counting principle and use this to determine the probabilities of events when the outcomes have equal probability • 7.S.8 interpret data to provide the basis for predictions and to establish experimental probabilities • 7.S.10 predict the outcome of an experiment • 7.S.11 design and conduct an experiment to test predictions • 7.S.12 compare actual results to predicted results • A.N.7 determine the number of possible events, using counting techniques or the fundamental principle of counting • A.N.8 determine the number of possible arrangements (permutations) of a list of items • A.S.18 know the definition of conditional probability and use it to solve for probabilities in finite sample spaces • A.S.19 determine the number of elements in a sample space and the number of favorable events • A.S. 20 calculate the probability of an event and its complement • A.S.21 determine empirical probabilities based on specific sample data • A.S.22 determine, based on calculated probability of a set of events, if : 	January/ February/ March	<ul style="list-style-type: none"> • Unit 9 Exam • Weekly take home quizzes • Quarterly benchmark exams

		<ul style="list-style-type: none"> ○ Some or all are equally likely to occur ○ One is more likely to occur than another ○ Whether or not an event is certain to happen or not to happen ● A.S.23 calculate the probability of : <ul style="list-style-type: none"> ○ A series of independent events ○ A series of dependent events ○ Two mutually exclusive events ○ Two events that are not mutually exclusive 		
unit 10: statistics	<ul style="list-style-type: none"> ● What information can be obtained using statistics? 	<ul style="list-style-type: none"> ● 5.S.1 Collect and record data from a variety of sources (e.g., newspapers, magazines, polls, charts, and surveys) ● 6.S.1 Develop the concept of sampling when collecting data from a population and decide the best method to collect data for a particular question ● 6.S.2 Record data in a frequency table ● 6.S.3 Construct Venn diagrams to sort data ● 6.S.4 Determine and justify the most appropriate graph to display a given set of data (pictograph, bar graph, line graph, histogram, or circle graph) ● 7.S.1 Identify and collect data using a variety of methods ● 7.S.2 Display data in a circle graph ● 7.S.3 Convert raw data into double bar graphs and double line graphs ● 7.S.7 Identify and explain misleading statistics and graphs ● A.S.1 Categorize data as qualitative or quantitative ● A.S.2 Determine whether the data to be analyzed is univariate or bivariate ● A.S.3 Determine when collected data or display of data may be biased ● A.S.4 Compare and contrast the appropriateness of different measures of central tendency for a given data set ● A.S.5 Construct a histogram, cumulative frequency histogram, and a 	April/ May/ June	<ul style="list-style-type: none"> ● Unit 10 Exam ● Weekly take home quizzes ● Quarterly benchmark exams

box-and-whisker plot, given a set of data

- **A.S.6** Understand how the five statistical summary (minimum, maximum, and the three quartiles) is used to construct a box-and-whisker plot
- **A.S.7** Create a scatter plot of bivariate data
- **A.S.8** Construct manually a reasonable line of best fit for a scatter plot and determine the equation of that line
- **A.S.9** Analyze and interpret a frequency distribution table or histogram, a cumulative frequency distribution table or histogram, or a box-and-whisker plot
- **A.S.10** Evaluate published reports and graphs that are based on data by considering: experimental design, appropriateness of the data analysis, and the soundness of the conclusions
- **A.S.11** Find the percentile rank of an item in a data set and identify the point values for first, second, and third quartiles
- **A.S.12** Identify the relationship between the independent and dependent variables from a scatter plot (positive, negative, or none)
- **A.S.13** Understand the difference between correlation and causation
- **A.S.14** Identify variables that might have a correlation but not a causal relationship
- **A.S.15** Identify and describe sources of bias and its effect, drawing conclusions from data
- **A.S.16** Recognize how linear transformations of one variable affect the data's mean, median, mode, and range
- **A.S.17** Use a reasonable line of best fit to make a prediction involving interpolation or extrapolation

COURSE:
GRADE LEVEL:

Math 8-9
Year 2 (of a 2 year compacted (accelerated) program)

Devlin/Anderson

MAIN/GENERAL TOPIC:	ESSENTIAL QUESTIONS:	CCSS:	WHEN STUDENT DOES IT:	ASSESSMENTS:
unit 1: Relationships between Quantities and Reasoning with Equations	How are equation and inequalities used to solve and describe numbers or relationships?	<p>N.Q.1 Use units as a way to understand problems and to guide the solution of multi-step problems; choose and interpret units consistently in formulas; choose and interpret the scale and the origin in graphs and data displays.</p> <p>N.Q.2 Define appropriate quantities for the purpose of descriptive modeling.</p> <p>N.Q.3 Choose a level of accuracy appropriate to limitations on measurement when reporting quantities.</p> <p>A.SSE.1 Interpret expressions that represent a quantity in terms of its context. Interpret parts of an expression, such as terms, factors, and coefficients. Interpret complicated expressions by viewing one or more of their parts as a single entity. <i>For example, interpret $P(1+r)n$ as the product of P and a factor not depending on P.</i></p> <p>A.CED.1 Create equations and inequalities in one variable and use them to solve problems. <i>Include equations arising from linear and quadratic functions, and simple rational and exponential functions.</i></p> <p>A.CED.2 Create equations in two or more variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales.</p> <p>A.CED.3 Represent constraints by equations or inequalities, and by systems of equations and/or inequalities, and interpret solutions as viable or non-viable options in a modeling context. <i>For example, represent inequalities describing nutritional and cost constraints on combinations of different foods.</i></p> <p>A.CED.4 Rearrange formulas to highlight a quantity of interest, using the same reasoning as in solving equations. <i>For example, rearrange Ohm's law $V = IR$ to highlight resistance R.</i></p> <p>A.REI.1 Explain each step in solving a simple equation as following from the equality of numbers asserted at the previous step, starting from the assumption that the original equation has a solution. Construct a viable argument to justify a solution method.</p> <p>A.REI.3 Solve linear equations and inequalities in one variable, including equations with coefficients represented by letters.</p>	Sept/ Oct	<ul style="list-style-type: none"> • Cumulative Exams • Problem Sets

<p>unit 2: Linear and Exponential Functions</p>	<p>How can we model relationships between quantities?</p>	<p>N.RN.1 Explain how the definition of the meaning of rational exponents follows from extending the properties of integer exponents to those values, allowing for a notation for radicals in terms of rational exponents. For example, we define $5^{1/3}$ to be the cube root of 5 because we want $(5^{1/3})^3 = 5(1/3)^3$ to hold, so $(5^{1/3})^3$ must equal 5.</p> <p>N.RN.2 Rewrite expressions involving radicals and rational exponents using the properties of exponents.</p> <p>8.EE.8 Analyze and solve pairs of simultaneous linear equations.</p> <p>a. Understand that solutions to a system of two linear equations in two variables correspond to points of intersection of their graphs, because points of intersection satisfy both equations simultaneously.</p> <p>b. Solve systems of two linear equations in two variables algebraically, and estimate solutions by graphing the equations. Solve simple cases by inspection. For example, $3x + 2y = 5$ and $3x + 2y = 6$ have no solution because $3x + 2y$ cannot simultaneously be 5 and 6.</p> <p>c. Solve real-world and mathematical problems leading to two linear equations in two variables. For example, given coordinates for two pairs of points, determine whether the line through the first pair of points intersects the line through the second pair.</p> <p>A.REI.5 Prove that, given a system of two equations in two variables, replacing one equation by the sum of that equation and a multiple of the other produces a system with the same solutions.</p> <p>A.REI.6 Solve systems of linear equations exactly and approximately (e.g., with graphs), focusing on pairs of linear equations in two variables.</p> <p>A.REI.10 Understand that the graph of an equation in two variables is the set of all its solutions plotted in the coordinate plane, often forming a curve (which could be a line).</p> <p>A.REI.11 Explain why the x-coordinates of the points where the graphs of the equations $y = f(x)$ and $y = g(x)$ intersect are the solutions of the equation $f(x) = g(x)$; find the solutions approximately, e.g., using technology to graph the functions, make tables of values, or find successive approximations. Include cases where $f(x)$ and/or $g(x)$ are linear, polynomial, rational, absolute value, exponential, and logarithmic functions.</p>	<p>Oct-Dec</p>	<ul style="list-style-type: none"> • Cumulative Exams • Problem Sets
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A.REI.12 Graph the solutions to a linear inequality in two variables as a half-plane (excluding the boundary in the case of a strict inequality), and graph the solution set to a system of linear inequalities in two variables as the intersection of the corresponding half-planes.

8.F.1 Understand that a function is a rule that assigns to each input exactly one output. The graph of a function is the set of ordered pairs consisting of an input and the corresponding output.

8.F.2 Compare properties of two functions each represented in a different way (algebraically, graphically, numerically in tables, or by verbal descriptions). For example, given a linear function represented by a table of values and a linear function represented by an algebraic expression, determine which function has the greater rate of change.

8.F.3 Interpret the equation $y = mx + b$ as defining a linear function, whose graph is a straight line; give examples of functions that are not linear. For example, the function $A = s^2$ giving the area of a square as a function of its side length is not linear because its graph contains the points (1,1), (2,4) and (3,9), which are not on a straight line.

F.IF.1 Understand that a function from one set (called the domain) to another set (called the range) assigns to each element of the domain exactly one element of the range. If f is a function and x is an element of its domain, then $f(x)$ denotes the output of f corresponding to the input x . The graph of f is the graph of the equation $y = f(x)$.

F.IF.2 Use function notation, evaluate functions for inputs in their domains, and interpret statements that use function notation in terms of a context.

F.IF.3 Recognize that sequences are functions, sometimes defined recursively, whose domain is a subset of the integers. For example, the Fibonacci sequence is defined recursively by $f(0) = f(1) = 1$, $f(n+1) = f(n) + f(n-1)$ for $n \geq 1$. 8.F.4 Construct a function to model a linear relationship between two quantities. Determine the rate of change and initial value of the function from a description of a relationship or from two (x, y) values, including reading these from a table or from a graph. Interpret the rate of change and initial value of a linear function in terms of the situation it models, and in terms of its graph or a table of values.

8.F.5 Describe qualitatively the functional relationship between two quantities by analyzing a graph (e.g., where the function is increasing or decreasing, linear or nonlinear). Sketch a graph that exhibits the qualitative features of a function that has been described verbally.

F.IF.4 For a function that models a relationship between two quantities, interpret key features of graphs and tables in terms of the quantities, and sketch graphs showing key features given a verbal description of the relationship. Key features include: intercepts; intervals where the function is

increasing, decreasing, positive, or negative; relative maximums and minimums; symmetries; end behavior; and periodicity.

F.IF.5 Relate the domain of a function to its graph and, where applicable, to the quantitative relationship it describes. For example, if the function $h(n)$ gives the number of person-hours it takes to assemble n engines in a factory, then the positive integers would be an appropriate domain for the function.

F.IF.6 Calculate and interpret the average rate of change of a function (presented symbolically or as a table) over a specified interval. Estimate the rate of change from a graph.

F.IF.7 Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases.

a. Graph linear and quadratic functions and show intercepts, maxima, and minima.

b. Graph exponential and logarithmic functions, showing intercepts and end behavior, and trigonometric functions, showing period, midline, and amplitude.

F.IF.9 Compare properties of two functions each represented in a different way (algebraically, graphically, numerically in tables, or by verbal descriptions). For example, given a graph of one quadratic function and an algebraic expression for another, say which has the larger maximum.

F.BF.1 Write a function that describes a relationship between two quantities.

a. Determine an explicit expression, a recursive process, or steps for calculation from a context.

b. Combine standard function types using arithmetic operations. For example, build a function that models the temperature of a cooling body by adding a constant function to a decaying exponential, and relate these functions to the model.

F.BF.2 Write arithmetic and geometric sequences both recursively and with an explicit formula, use them to model situations, and translate between the two forms.

F.BF.3 Identify the effect on the graph of replacing $f(x)$ by $f(x) + k$, $k f(x)$, $f(kx)$, and $f(x + k)$ for specific values of k (both positive and negative); find the value of k given the graphs. Experiment with cases and illustrate an explanation of the effects on the graph using technology. Include recognizing even and odd functions from their graphs and algebraic expressions for them.

F.LE.1 Distinguish between situations that can be modeled with linear functions and with exponential functions.

		<p>a. Prove that linear functions grow by equal differences over equal intervals; and that exponential functions grow by equal factors over equal intervals.</p> <p>b. Recognize situations in which one quantity changes at a constant rate per unit interval relative to another.</p> <p>c. Recognize situations in which a quantity grows or decays by a constant percent rate per unit interval relative to another.</p> <p>F.LE.2 Construct linear and exponential functions, including arithmetic and geometric sequences, given a graph, a description of a relationship, or two input-output pairs (include reading these from a table).</p> <p>F.LE.3 Observe using graphs and tables that a quantity increasing exponentially eventually exceeds a quantity increasing linearly, quadratically, or (more generally) as a polynomial function.</p> <p>F.LE.5 Interpret the parameters in a linear or exponential function in terms of a context.</p>		
<p>unit 3: Descriptive Statistics</p>	<p>How are patterns used when comparing two quantities?</p>	<p>S.ID.1 Represent data with plots on the real number line (dot plots, histograms, and box plots).</p> <p>S.ID.2 Use statistics appropriate to the shape of the data distribution to compare center (median, mean) and spread (interquartile range, standard deviation) of two or more different data sets.</p> <p>S.ID.3 Interpret differences in shape, center, and spread in the context of the data sets, accounting for possible effects of extreme data points (outliers).</p> <p>8.SP.1 Construct and interpret scatter plots for bivariate measurement data to investigate patterns of association between two quantities. Describe patterns such as clustering, outliers, positive or negative association, linear association, and nonlinear association.</p> <p>8.SP.2 Know that straight lines are widely used to model relationships between two quantitative variables. For scatter plots that suggest a linear association, informally fit a straight line, and informally assess the model fit by judging the closeness of the data points to the line.</p> <p>8.SP.3 Use the equation of a linear model to solve problems in the context of bivariate measurement data, interpreting the slope and intercept. <i>For example, in a linear model for a biology experiment, interpret a slope of 1.5 cm/hr as meaning that an additional hour of sunlight each day is associated with an additional 1.5 cm in mature plant height.</i></p> <p>8.SP.4 Understand that patterns of association can also be seen in bivariate categorical data by</p>	<p>Jan.</p>	<ul style="list-style-type: none"> • Cumulative Exams • Problem Sets

		<p>displaying frequencies and relative frequencies in a two-way table. Construct and interpret a two-way table summarizing data on two categorical variables collected from the same subjects. Use relative frequencies calculated for rows or columns to describe possible association between the two variables. <i>For example, collect data from students in your class on whether or not they have a curfew on school nights and whether or not they have assigned chores at home. Is there evidence that those who have a curfew also tend to have chores.</i></p> <p>S.ID.5 Summarize categorical data for two categories in two-way frequency tables. Interpret relative frequencies in the context of the data (including joint, marginal, and conditional relative frequencies). Recognize possible associations and trends in the data.</p> <p>S.ID.6 Represent data on two quantitative variables on a scatter plot, and describe how the variables are related.</p> <p>a. Fit a function to the data; use functions fitted to data to solve problems in the context of the data. <i>Use given functions or choose a function suggested by the context. Emphasize linear and exponential models.</i></p> <p>b. Informally assess the fit of a function by plotting and analyzing residuals.</p> <p>c. Fit a linear function for a scatter plot that suggests a linear association.</p> <p>S.ID.7 Interpret the slope (rate of change) and the intercept (constant term) of a linear model in the context of the data.</p> <p>S.ID.8 Compute (using technology) and interpret the correlation coefficient of a linear fit.</p> <p>S.ID.9 Distinguish between correlation and causation.</p>		
<p>unit 4: Expressions and Equations</p>	<p>What is equivalence?</p>	<p>A.SSE.1 Interpret expressions that represent a quantity in terms of its context.</p> <p>a. Interpret parts of an expression, such as terms, factors, and coefficients.</p> <p>b. Interpret complicated expressions by viewing one or more of their parts as a single entity. <i>For example, interpret $P(1+r)^n$ as the product of P and a factor not depending on P.</i></p> <p>A.SSE.2 Use the structure of an expression to identify ways to rewrite it. <i>For example, see $x^4 - y^4$ as $(x^2)^2 - (y^2)^2$, thus recognizing it as a difference of squares that can be factored as $(x^2 - y^2)(x^2 + y^2)$.</i></p>	<p>Feb./Mar.</p>	<ul style="list-style-type: none"> • Cumulative Exams • Problem Sets

A.SSE.3 Choose and produce an equivalent form of an expression to reveal and explain properties of the quantity represented by the expression.

a. Factor a quadratic expression to reveal the zeros of the function it defines.

b. Complete the square in a quadratic expression to reveal the maximum or minimum value of the function it defines.

c. Use the properties of exponents to transform expressions for exponential functions. *For example the expression $1.15t$ can be rewritten as $(1.151/12)^{12t} \approx 1.012^{12t}$ to reveal the approximate equivalent monthly interest rate if the annual rate is 15%.*

A.APR.1 Understand that polynomials form a system analogous to the integers, namely, they are closed under the operations of addition, subtraction, and multiplication; add, subtract, and multiply polynomials.

A.CED.1 Create equations and inequalities in one variable and use them to solve problems. *Include equations arising from linear and quadratic functions, and simple rational and exponential functions.*

A.CED.2 Create equations in two or more variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales.

A.CED.4 Rearrange formulas to highlight a quantity of interest, using the same reasoning as in solving equations. *For example, rearrange Ohm's law $V = IR$ to highlight resistance R .*

A.REI.4 Solve quadratic equations in one variable.

a. Use the method of completing the square to transform any quadratic equation in x into an equation of the form $(x - p)^2 = q$ that has the same solutions. Derive the quadratic formula from this form.

b. Solve quadratic equations by inspection (e.g., for $x^2 = 49$), taking square roots, completing the square, the quadratic formula and factoring, as appropriate to the initial form of the equation. Recognize when the quadratic formula gives complex solutions and write them as $a \pm bi$ for real numbers a and b .

A.REI.7 Solve a simple system consisting of a linear equation and a quadratic equation in two variables algebraically and graphically. *For example, find the points of intersection between the line $y = -3x$ and the circle $x^2 + y^2 = 3$.*

<p>unit 5: Quadratic Functions and Modeling</p>	<p>What is a mathematical model?</p>	<p>N.RN.3 Explain why the sum or product of two rational numbers is rational; that the sum of a rational number and an irrational number is irrational; and that the product of a nonzero rational number and an irrational number is irrational.</p> <p>8.G.6 Explain a proof of the Pythagorean theorem and its converse.</p> <p>8.G.7 Apply the Pythagorean theorem to determine unknown side lengths in right triangles in real-world and mathematical problems in two and three dimensions.</p> <p>8.G.8 Apply the Pythagorean theorem to find the distance between two points in a coordinate system.</p> <p>F.IF.4 For a function that models a relationship between two quantities, interpret key features of graphs and tables in terms of the quantities, and sketch graphs showing key features given a verbal description of the relationship. <i>Key features include: intercepts; intervals where the function is increasing, decreasing, positive, or negative; relative maximums and minimums; symmetries; end behavior; and periodicity.</i></p> <p>F.IF.5 Relate the domain of a function to its graph and, where applicable, to the quantitative relationship it describes. <i>For example, if the function $h(n)$ gives the number of person-hours it takes to assemble n engines in a factory, then the positive integers would be an appropriate domain for the function.</i></p> <p>F.IF.6 Calculate and interpret the average rate of change of a function (presented symbolically or as a table) over a specified interval. Estimate the rate of change from a graph.</p> <p>F.IF.7 Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases.</p> <p>a. Graph linear and quadratic functions and show intercepts, maxima, and minima.</p> <p>b. Graph square root, cube root, and piecewise-defined functions, including step functions and absolute value functions.</p> <p>F.IF.8 Write a function defined by an expression in different but equivalent forms to reveal and explain different properties of the function.</p> <p>a. Use the process of factoring and completing the square in a quadratic function to show zeros, extreme values, and symmetry of the graph, and interpret these in terms of a context.</p>	<p>Mar/ Apr.</p>	<ul style="list-style-type: none"> • Cumulative Exams • Problem Sets
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b. Use the properties of exponents to interpret expressions for exponential functions. *For example, identify percent rate of change in functions such as $y = (1.02)^t$, $y = (0.97)^t$, $y = (1.01)^{12t}$, $y = (1.2)^{t/10}$, and classify them as representing exponential growth or decay.*

F.IF.9 Compare properties of two functions each represented in a different way (algebraically, graphically, numerically in tables, or by verbal descriptions). *For example, given a graph of one quadratic function and an algebraic expression for another, say which has the larger maximum.*

F.BF.1 Write a function that describes a relationship between two quantities.

a. Determine an explicit expression, a recursive process, or steps for calculation from a context.

b. Combine standard function types using arithmetic operations. *For example, build a function that models the temperature of a cooling body by adding a constant function to a decaying exponential, and relate these functions to the model.*

F.BF.3 Identify the effect on the graph of replacing $f(x)$ by $f(x) + k$, $k f(x)$, $f(kx)$, and $f(x + k)$ for specific values of k (both positive and negative); find the value of k given the graphs. Experiment with cases and illustrate an explanation of the effects on the graph using technology. *Include recognizing even and odd functions from their graphs and algebraic expressions for them.*

F.BF.4 Find inverse functions.

a. Solve an equation of the form $f(x) = c$ for a simple function f that has an inverse and write an expression for the inverse. *For example, $f(x) = 2x^3$ for $x > 0$ or $f(x) = (x+1)/(x-1)$ for $x \neq 1$.*

F.LE.3 Observe using graphs and tables that a quantity increasing exponentially eventually exceeds a quantity increasing linearly, quadratically, or (more generally) as a polynomial function.

COURSE: Math
GRADE LEVEL: 8R

MAIN/GENERAL TOPIC:	SUB-TOPIC:	STRAND/PI	WHEN STUDENT DOES IT:	ASSESSMENTS:
UNIT 1: THE NUMBER SYSTEM	<ul style="list-style-type: none"> • Rational /Irrational • Rational Approximation 	<p>8. NS.1 Know that numbers that are not rational are called irrational. Understand informally that every number has a decimal expansion; for rational numbers show that the decimal expansion repeats eventually, and convert a decimal expansion which repeats eventually into a rational number.</p> <p>8.NS.2 Use rational approximations of irrational numbers to compare the size of irrational numbers, locate them approximately on a number line diagram, and estimate the value of expressions (e.g., π^2). <i>For example, by truncating the decimal expansion of π^2, show that π^2 is between 1 and 2, then between 1.4 and 1.5, and explain how to continue on to get better approximations.</i></p>	September	<ul style="list-style-type: none"> • Unit 1 Exam
UNIT 2: EXPONENTS & SCIENTIFIC NOTATION	<ul style="list-style-type: none"> • Exponent Properties • Scientific Notation • Operations with Scientific Notation 	<p>8.EE.1 Know and apply the properties of integer exponents to generate equivalent numerical expressions. <i>For example, $3^2 \times 3^{-5} = 3^{-3} = 1/3^3 = 1/27$.</i></p> <p>8.EE.3 Use numbers expressed in the form of a single digit times an Integer power of 10 to estimate very large or very small quantities, and to express how many times as much one is than the other. <i>For example, estimate the population of the United States as 3×10^8 and the population of the world as 7×10^9, and determine that the world population is more than 20 times larger.</i></p> <p>8.EE.4 Perform operations with numbers expressed in scientific notation, including problems where both decimal and scientific notation are used. Use scientific notation and choose units of appropriate size for measurements of very large or very small quantities (e.g., use millimeters per year for seafloor spreading).</p>	October/November	<ul style="list-style-type: none"> • Unit 2 Exam

		Interpret scientific notation that has been generated by technology.		
UNIT 3: SOLVING EQUATIONS	<ul style="list-style-type: none"> Solve linear equations in one variable 	<p>8.EE.7 Solve linear equations in one variable.</p> <p>a. Give examples of linear equations in one variable with one solution, infinitely many solutions, or no solutions. Show which of these possibilities is the case by successively transforming the given equation into simpler forms, until an equivalent equation of the form $x = a$, $a = a$, or $a = b$ results (where a and b are different numbers).</p> <p>b. Solve linear equations with rational number coefficients, including equations whose solutions require expanding expressions using the distributive property and collecting like terms.</p>	November/ December	<ul style="list-style-type: none"> Unit 3 Exam
UNIT 4: PYTHAGOREAN THEOREM	<ul style="list-style-type: none"> Square Roots & Cube Roots 	<p>8.EE.2 Use square root and cube root symbols to represent solutions to equations of the form $x^2 = p$ and $x^3 = p$, where p is a positive rational number. Evaluate square roots of small perfect squares and cube roots of small perfect cubes. Know that $\sqrt{2}$ is irrational.</p> <p>8.G.6 Explain a proof of the Pythagorean Theorem and its converse.</p> <p>8.G.7 Apply the Pythagorean Theorem to determine unknown side lengths in right triangles in real-world and mathematical problems in two and three dimensions.</p> <p>8.G.8 Apply the Pythagorean Theorem to find the distance between two points in a coordinate system.</p>	January	<ul style="list-style-type: none"> Unit 4 Exam
UNIT 5: LINEAR FUNCTIONS	<ul style="list-style-type: none"> Proportional Relationships Lines and Linear Equations Systems Functions 	<p>8.EE.5 Graph proportional relationships, interpreting the unit rate as the slope of the graph. Compare two different proportional relationships represented in different ways. <i>For example, compare a distance-time graph to a distance-time equation to determine which of two moving objects has greater speed.</i></p> <p>8.EE.6. Use similar triangles to explain why the slope m is the same between any two distinct points on a non-vertical line in the coordinate plane; derive the equation $y = mx$ for a line through the origin and the equation $y = mx + b$ for a line intercepting the</p>	February/March	<ul style="list-style-type: none"> Unit 5 Exam

		<p>vertical axis at b.</p> <p>8.EE.8 Analyze and solve pairs of simultaneous linear equations.</p> <ol style="list-style-type: none"> Understand that solutions to a system of two linear equations in two variables correspond to points of intersection of their graphs, because points of intersection satisfy both equations simultaneously. Solve systems of two linear equations in two variables algebraically, and estimate solutions by graphing the equations. Solve simple cases by inspection. <i>For example, $3x + 2y = 5$ and $3x + 2y = 6$ have no solution because $3x + 2y$ cannot simultaneously be 5 and 6.</i> Solve real-world and mathematical problems leading to two linear equations in two variables. <i>For example, given coordinates for two pairs of points, determine whether the line through the first pair of points intersects the line through the second pair.</i> <p>8.F.1 Understand that a function is a rule that assigns to each input exactly one output. The graph of a function is the set of ordered pairs consisting of an input and the corresponding output.</p> <p>8.F.2 Compare properties of two functions each represented in a different way (algebraically, graphically, numerically in tables, or by verbal descriptions). <i>For example, given a linear function represented by a table of values and a linear function represented by an algebraic expression, determine which function has the greater rate of change.</i></p> <p>8.F.3 Interpret the equation $y = mx + b$ as defining a linear function, whose graph is a straight line; give examples of functions that are not linear. <i>For example, the function $A = s^2$ giving the area of a square as a function of its side length is not linear because its graph contains the points $(1, 1)$, $(2, 4)$ and $(3, 9)$, which are not on a straight line.</i></p> <p>8.F.4 Construct a function to model a linear relationship between two quantities. Determine the rate of change and initial value of the function from a description of a relationship or from two (x, y)</p>		
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		<p>values, including reading these from a table or from a graph. Interpret the rate of change and initial value of a linear function in terms of the situation it models, and in terms of its graph or a table of values.</p> <p>8.F.5 Describe qualitatively the functional relationship between two quantities by analyzing a graph (e.g., where the function is increasing or decreasing, linear or nonlinear). Sketch a graph that exhibits the qualitative features of a function that has been described verbally.</p>		
<p>UNIT 6: GEOMETRY</p>	<ul style="list-style-type: none"> • Congruence • Similarity • Volume 	<p>8.G.1. Verify experimentally the properties of rotations, reflections, and translations:</p> <p>a. Lines are taken to lines, and line segments to line segments of the same length.</p> <p>b. Angles are taken to angles of the same measure.</p> <p>c. Parallel lines are taken to parallel lines.</p> <p>8.G.2. Understand that a two-dimensional figure is congruent to another if the second can be obtained from the first by a sequence of rotations, reflections, and translations; given two congruent figures, describe a sequence that exhibits the congruence between them.</p> <p>8.G.3. Describe the effect of dilations, translations, rotations, and reflections on two-dimensional figures using coordinates.</p> <p>8.G.4. Understand that a two-dimensional figure is similar to another if the second can be obtained from the first by a sequence of rotations, reflections, translations, and dilations; given two similar two-dimensional figures, describe a sequence that exhibits the similarity between them.</p> <p>8.G.5. Use informal arguments to establish facts about the angle sum and exterior angle of triangles, about the angles created when parallel lines are cut by a transversal, and the angle-angle criterion for similarity of triangles. <i>For example, arrange three copies of the same triangle so that the sum of the three angles appears to form a line, and give an argument in terms of</i></p>	<p>March/April</p>	<ul style="list-style-type: none"> • Unit 6 Exam

		<p><i>transversals why this is so.</i></p> <p>8.G.9. Know the formulas for the volumes of cones, cylinders, and spheres and use them to solve real-world and mathematical problems</p>		
<p>UNIT 7: STATISTICS AND PROBABILITY</p>	<ul style="list-style-type: none"> Patterns of association in bivariate data 	<p>8.SP.1. Construct and interpret scatter plots for bivariate measurement data to investigate patterns of association between two quantities. Describe patterns such as clustering, outliers, positive or negative association, linear association, and nonlinear association.</p> <p>8.SP.2. Know that straight lines are widely used to model relationships between two quantitative variables. For scatter plots that suggest a linear association, informally fit a straight line, and informally assess the model fit by judging the closeness of the data points to the line.</p> <p>8.SP.3. Use the equation of a linear model to solve problems in the context of bivariate measurement data, interpreting the slope and intercept. <i>For example, in a linear model for a biology experiment, interpret a slope of 1.5 cm/hr as meaning that an additional hour of sunlight each day is associated with an additional 1.5 cm in mature plant height.</i></p> <p>8.SP.4. Understand that patterns of association can also be seen in bivariate categorical data by displaying frequencies and relative frequencies in a two-way table. Construct and interpret a two-way table summarizing data on two categorical variables collected from the same subjects. Use relative frequencies calculated for rows or columns to describe possible association between the two variables. <i>For example, collect data from students in your class on whether or not they have a curfew on school nights and whether or not they have assigned chores at home. Is there evidence that those who have a curfew also tend to have chores?</i></p>	<p>April</p>	<ul style="list-style-type: none"> Unit 7 Exam

COURSE: Math 9 (Algebra 1 / Common Core)
GRADE LEVEL: 9th Grade

MAIN/GENERAL TOPIC:	SUB-TOPIC: (Performance Indicator)	ESSENTIAL QUESTIONS:	WHAT THE STUDENTS WILL KNOW OR BE ABLE TO DO:		WHEN STUDENT DOES IT:	ASSESSMENT:
Number Theory	Real Numbers	<ul style="list-style-type: none"> • Are all numbers the same? • How many number sets are there? 	<ul style="list-style-type: none"> • Explain Real Numbers • Identify Rational vs Irrational #s • Identify Integer vs Whole vs Counting Numbers 	▪	Sep	Homework Quizzes
	Order of Operations	<ul style="list-style-type: none"> • Can you do operations in any order? 	<ul style="list-style-type: none"> • Follow correct Order of Operations (PEMDAS) 		Sep	Homework Quizzes
	Properties & Systems	<ul style="list-style-type: none"> ◆ Can all properties be used with all operations? 	<ul style="list-style-type: none"> ▪ Correctly utilize properties in solving equations (i.e., commutative, associative, distributive, closure, identity, inverse, etc) 	▪	Sep	Homework Quizzes
POLYNOMIALS and EXPONENTS	Variables	<ul style="list-style-type: none"> ◆ What is a variable? 	<ul style="list-style-type: none"> ▪ Variables in expressions/equations ▪ Explain algebraic terminology ▪ Explain why variables are used 		Sep	Homework Quizzes
	Algebraic Expressions	<ul style="list-style-type: none"> ◆ What is a like term? 	<ul style="list-style-type: none"> ▪ Add / subtract / multiply / divide monomials and polynomials ▪ Explain like terms 		Sep	Homework Quizzes

	Verbal Phrases	◆ Twice a number means what?	<ul style="list-style-type: none"> ▪ Translate verbal phrases into algebraic language ▪ Expressions vs Equations 		Sep	Homework Quizzes
	Exponents	◆ What does an exponent tell us to do?	<ul style="list-style-type: none"> ▪ Identify base, power, exponent ▪ Evaluate expressions that include exponents ▪ Multiply and divide variables with exponents ▪ Explain difference of positive and negative exponents ▪ Explain significance of a power raised to a power 		Sep	Homework Quizzes
	Scientific Notation	◆ Why do we use scientific notation?	<ul style="list-style-type: none"> ▪ Rewrite large and/or small numbers using scientific notation ▪ Multiply / divide numbers written in scientific notation 		Sep	Homework Quizzes UNIT TEST
FUNCTIONS	Domain / Range	◆ What is difference between domain and range?	<ul style="list-style-type: none"> ▪ Find domain and range of functions based on a graph, table or mapping ▪ Explain possible limits of each Write in interval notation 		Oct	Homework Quizzes
		◆ What is a function?	<ul style="list-style-type: none"> ▪ Identify and explain what makes a relationship/equation a function 	▪	Oct	Homework Quizzes
		◆ Explain vertical line test?	<ul style="list-style-type: none"> ▪ Will be able to determine if a graph represents a function based on the vertical line test ▪ 		Oct	Homework Quizzes

		<ul style="list-style-type: none"> ▪ Are there more than one type of function? 	Identify linear, quadratic and exponential functions based on a graph and/or equation.	▪	Oct	Homework Quizzes UNIT TEST
SOLVING LINEAR EQUATIONS and INEQUALITIES	Solving Equations	<ul style="list-style-type: none"> ◆ How do you solve equations? ◆ Is there more than one way to solve most problems? 	<ul style="list-style-type: none"> ▪ Follow steps to solve one and two step equations ▪ Choose appropriate strategies ▪ Combine strategies (i.e.; clear fractions, set to zero, etc) ▪ Solve equations containing fractions and decimals 	▪	Oct	Homework Quizzes
	Word Problems	<ul style="list-style-type: none"> ◆ How does using variables help us solve problems? 	<ul style="list-style-type: none"> ▪ Translate verbal phrases into algebraic equations ▪ Use equations to solve problems ▪ Use "let" statements 		Oct	Homework Quizzes
	Properties	<ul style="list-style-type: none"> ◆ What is an inequality? ◆ How is it different? 	<ul style="list-style-type: none"> ▪ Identify inequalities in problems ▪ Use addition / subtraction / multiplication / division with inequalities 	▪	Oct	Homework Quizzes
	Solution Sets	<ul style="list-style-type: none"> ◆ How many points satisfy inequalities? 	<ul style="list-style-type: none"> ▪ Determine solution sets of inequalities using properties ▪ Represent solution set on number line 		Oct	Homework Quizzes UNIT TEST

GRAPHING LINEAR EQUATIONS and INEQUALITIES	Coordinate Plane	<ul style="list-style-type: none"> ◆ Are coordinate planes used in real-life? 	<ul style="list-style-type: none"> ▪ Graph using x- and y-axis ▪ Understand meaning of input variable and output variable (Dependent vs Independent variable) 		Nov	Homework Quizzes
	Slope & Y- Intercept	<ul style="list-style-type: none"> ◆ What does the slope tell us? ◆ The y-intercept tells us what? 	<ul style="list-style-type: none"> ▪ Identify lines having positive / negative / zero / undefined slopes ▪ Identify parts of the linear equation $y = mx + b$ 		Nov	Homework Quizzes
	Calculation of Slope	<ul style="list-style-type: none"> ◆ What can you tell by the slope? 	<ul style="list-style-type: none"> ▪ Calculate slope of a line (Rise over Run , Rate of Change, Change of Y over Change of X) 		Nov	Homework Quizzes
	Equations Of Lines	<ul style="list-style-type: none"> ◆ Can every line be shown by an equation? 	<ul style="list-style-type: none"> ▪ Calculate equation of a line given 2 points or given 1 point and the slope ▪ Manipulate equations to get them into the form $y = mx + b$ 		Nov	Homework Quizzes
	Graphing	<ul style="list-style-type: none"> ◆ How do we use the equation of a line to graph that line? 	<ul style="list-style-type: none"> ▪ Graph lines with positive / negative / zero / undefined slope ▪ Identify slopes from visual representations of a line 		Nov	Homework Quizzes
	Linear Relationships	<ul style="list-style-type: none"> ◆ Can we tell things about lines knowing their slopes? 	<ul style="list-style-type: none"> ▪ Identify lines that are parallel / perpendicular / vertical / horizontal by their slope 		Nov	Homework Quizzes

	Graphing	◆ How do you show an inequality when graphing?	<ul style="list-style-type: none"> ▪ Use coordinate plane to show solution set of an inequality ▪ Understand meaning of a graph of an inequality 		Nov	Homework Quizzes
	Word Problems	◆ How does using variables help us solve problems?	<ul style="list-style-type: none"> ▪ Translate verbal phrases into algebraic equations ▪ Use equations to solve problems ▪ Use "let" statements 		Nov	Homework Quizzes UNIT TEST
SYSTEMS of EQUATIONS and INEQUALITIES	Sets of Linear Equations	◆ What is the difference between solving algebraically and graphically?	<ul style="list-style-type: none"> ▪ Solve system of equations using addition / substitution / graphing ▪ Understand trial and error is a valid process to solve equations 		Nov	Homework Quizzes
		◆ Is graphing a viable means for solving systems of equations?	<ul style="list-style-type: none"> ▪ Solve system of equations using the graphing method ▪ Understand where to find results 		Dec	Homework Quizzes
		◆ How can we solve systems of equations algebraically?	<ul style="list-style-type: none"> ▪ Solve system of equations using addition and substitution methods ▪ Utilize various algebraic methods to solve systems of equations 		Dec	Homework Quizzes
	Sets of Inequalities	◆ How do you show inequalities when graphing?	<ul style="list-style-type: none"> ▪ Solve compound inequalities ▪ Utilize proper procedures when dealing with inequalities (i.e., switching direction when multiplying or dividing by negative numbers) ▪ Understand where to find the solution set 		Dec	Homework Quizzes UNIT TEST

EXPONENTIAL EQUATIONS	Growth and Decay and Compound Interest	◆ Identify what makes an equation exponential?	<ul style="list-style-type: none"> ▪ Identify individual formulas ▪ Input correct data into formulas ▪ Utilize calculator to solve for unknown 		Dec	Homework Quizzes
			<ul style="list-style-type: none"> ▪ Graph exponential equations ▪ Identify whether exponential growth or decay equation through represented graph 		Dec	Homework Quizzes UNIT TEST
SEQUENCES	Arithmetic and Geometric	◆ What is a sequence?	<ul style="list-style-type: none"> ▪ Identify each sequence to its major category ▪ Develop functions based on a list of numbers ▪ Find any unknown term 		Jan	Homework Quizzes UNIT TEST
		▪	MIDTERM EXAM	▪		
FACTORING	Factoring Single Step	◆ How are FOIL and factoring related?	<ul style="list-style-type: none"> ▪ Find Greatest Common Factor (GCF) ▪ Identify Difference of Two Perfect Squares ▪ Employ FOIL backwards / Master Product / Arc Method 		Jan	Homework Quizzes
	Factoring Multi-Step	◆ What does factoring completely mean?	<ul style="list-style-type: none"> ▪ Use multi steps to break polynomials down to their prime factors ▪ Factor by Grouping 		Feb	Homework Quizzes UNIT TEST

RADICALS	Square Roots	◆ How do we simplify radicals?	<ul style="list-style-type: none"> ▪ Identify perfect square radicals and simplify ▪ Identify non-perfect radicals and simplify 		Feb	Homework Quizzes
		◆ Can we perform operations with radicals?	<ul style="list-style-type: none"> ▪ Add and subtract radicals and simplify result ▪ Multiply and divide radicals and simplify result 		Feb	Homework Quizzes
		◆ Estimating values	<ul style="list-style-type: none"> ▪ Use calculator to find various roots of a radical 			Homework Quizzes
						UNIT TEST
SOLVING QUADRATICS	Quadratic Equations	◆ How does factoring help us solve verbal problems?	<ul style="list-style-type: none"> ▪ Identify quadratic equations ▪ Identify quadratics in Standard Form ▪ Factor quadratic equations 		Mar	Homework Quizzes
	Solving Quadratics	◆ Why do we set quadratic equal to zero?	<ul style="list-style-type: none"> ▪ Manipulate equations to get into standard form ▪ Utilize factoring to solve equations (Roots vs Factors) ▪ Complete square to solve quadratic equations ▪ Derive and utilize the quadratic formula 		Mar	Homework Quizzes
	Word Problems	◆ Are there life problems that result in quadratic equations?	<ul style="list-style-type: none"> ▪ Solve appropriate word problems ▪ Identify unrealistic results 		Mar	Homework Quizzes
GRAPH QUADRATICS	Graphing Quadratics	<ul style="list-style-type: none"> ◆ What does the graph show us? ◆ Is it a function? 	<ul style="list-style-type: none"> ▪ Utilize graphing calculator ▪ Identify points of interest (roots, vertex, axis of symmetry) ▪ Identify minimum and maximum points if appropriate 		Mar	Homework Quizzes

			<ul style="list-style-type: none"> ▪ Explain what changing coefficient values do to the graph ▪ Write equations based on roots 			
	Quadratic and Linear System of Equations	◆ How many possible solutions are there?	<ul style="list-style-type: none"> ▪ Solve Algebraically ▪ Solve Graphically 		Mar	Homework Quizzes UNIT TEST
	Word Problems	◆ Are there life problems that result in quadratic equations?	<ul style="list-style-type: none"> ▪ Solve appropriate word problems ▪ Identify unrealistic results 		Mar	Homework Quizzes
UNIVARIATE STATISTICS	Statistics Measuring One Variable	◆ What is meant by univariate data?	<ul style="list-style-type: none"> ▪ Develop box-plot, histograms, and dot plots from data 		Apr	Homework Quizzes
		◆	<ul style="list-style-type: none"> ▪ Find mean, median, mode of data ▪ Find standard deviation ▪ Identify normal/skewed distribution 			Homework Quizzes
	Word Problems	◆ Are there life problems that result in quadratic equations?	<ul style="list-style-type: none"> ▪ Solve appropriate word problems ▪ Identify unrealistic results 		Apr	Homework Quizzes UNIT TEST
BIVARIATE STATISTICS	Statistics Measuring Two Variables	◆ What is meant by bivariate data?	<ul style="list-style-type: none"> ▪ Develop two-way tables ▪ Develop scatter plots from data ▪ Find residuals 		May	Homework Quizzes

	Word Problems	◆ Are there life problems that result in quadratic equations?	<ul style="list-style-type: none"> ▪ Solve appropriate word problems ▪ Identify unrealistic results 		May	Homework Quizzes
						UNIT TEST
MIXED FUNCTIONS	Other Functions	◆ What other types of functions may we come in contact with?	<ul style="list-style-type: none"> ▪ Graph various functions ▪ Graph Cubic, Absolute Value, Step, Piece-wise functions ▪ Calculate and identify linear, exponential, and quadratic regression 		May	Homework Quizzes
		◆ How can we change the shape of a graph?	<ul style="list-style-type: none"> ▪ Identify changes when coefficient change ▪ Identify changes when we add or subtract numbers inside or outside the function 		Jun	Homework Quizzes
		▪	<ul style="list-style-type: none"> • Month of June used for review 			UNIT TEST
		▪	<p style="text-align: center;">NEW YORK STATE COMMON CORE ALGEBRA 1 REGENTS EXAM</p>			
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COURSE: Math A1 (Algebra 1 / Common Core)
1st year of 2-year Program for Algebra 1

GRADE LEVEL: 9

MAIN/GENERAL TOPIC	SUB-TOPIC (Performance Indicator)	ESSENTIAL QUESTIONS	WHAT STUDENTS WILL KNOW OR BE ABLE TO DO		WHEN STUDENT DOES IT	ASSESSMENT
NUMBER THEORY	Real Numbers	<ul style="list-style-type: none"> ◆ Are all #s the same? ◆ How many #s are there? 	<ul style="list-style-type: none"> ▪ Explain Real Numbers ▪ Identify Rational vs Irrational #s ▪ Identify Integer vs Whole vs Counting Numbers 		Sep	Homework Quizzes
	Order of Operations	<ul style="list-style-type: none"> • Can you do operations in any order? 	<ul style="list-style-type: none"> • Follow correct Order of Operations (PEMDAS) 		Sep	Homework Quizzes
	Properties & Systems	<ul style="list-style-type: none"> ◆ Can all 	<ul style="list-style-type: none"> ▪ Correctly utilize properties in solving 		Oct	Homework

		properties be used with all operations?	equations (i.e., commutative, associative, distributive, closure, identity, inverse, etc)			Quizzes
	Verbal Phrases	◆ Twice a number means what?	<ul style="list-style-type: none"> ▪ Translate verbal phrases into algebraic language ▪ Expressions vs Equations 		Oct	Homework Quizzes
	Solving Equations	◆ How do you solve equations? Is there more than one way to solve most problems?	<ul style="list-style-type: none"> ▪ Follow steps to solve one and two step equations <ul style="list-style-type: none"> ▪ Choose appropriate strategies ▪ Combine strategies (i.e.; clear fractions, set to zero, etc) ▪ Solve equations containing fractions and decimals 		Nov	Homework Quizzes UNIT TEST
SOLVING LINEAR EQUATIONS and INEQUALITIES	Solving Multi-Step Equations And Inequalities	◆ How do you solve multi-step equations and inequalities?	<ul style="list-style-type: none"> ▪ Choose appropriate strategies ▪ Combine strategies (i.e.; clear fractions, set to zero, etc) ▪ Solve equations containing fractions and decimals 		Dec	Homework Quizzes
	Word Problems	◆ How does using variables help us solve problems?	<ul style="list-style-type: none"> ▪ Translate verbal phrases into algebraic equations ▪ Use equations to solve problems ▪ Use "let" statements ▪ 		Dec	Homework Quizzes
FUNCTIONS	Domain / Range	◆ What is difference between domain and range?	<ul style="list-style-type: none"> ◆ Find domain and range of functions based on a graph, table or mapping ◆ Explain possible limits of each ◆ Write in interval notation ◆ 		Jan	Homework Quizzes
		◆ What is a function?	<ul style="list-style-type: none"> ▪ Identify and explain what makes a relationship/equation a 		Jan	Homework Quizzes

			function			
		◆ Explain vertical line test?	<ul style="list-style-type: none"> ▪ Will be able to determine if a graph represents a function based on the vertical line test ▪ 		Feb	Homework Quizzes
		◆ Are there more than one type of function?	<ul style="list-style-type: none"> ▪ Identify linear, quadratic and exponential functions based on a graph and/or equation. 		Mar	Homework Quizzes UNIT TEST
	Arithmetic Sequences	What is a sequence?	<ul style="list-style-type: none"> ▪ Identify each sequence to its major category ▪ Develop functions based on a list of numbers <p>Find any unknown term</p>		Apr	Homework Quizzes UNIT TEST
POLYNOMIALS	Algebraic Expressions	◆ What is a like term?	<ul style="list-style-type: none"> ▪ Add / subtract / multiply / divide monomials and polynomials <p>Explain like terms</p>		May	Homework Quizzes
	Variables	◆ What is a variable?	<ul style="list-style-type: none"> ▪ Variables in expressions/equations ▪ Explain algebraic terminology ▪ Explain why variables are used 		May	Homework Quizzes
LOCAL FINAL						

MAIN/GENERAL TOPIC:	SUB-TOPIC: (PERFORMANCE INDICATOR)	ESSENTIAL QUESTIONS:	WHAT STUDENTS WILL KNOW OR BE ABLE TO DO:	WHEN STUDENT DOES IT:	ASSESSMENTS:
NUMBER THEORY	Real Numbers	<ul style="list-style-type: none"> ▪ Are all #s the same? ▪ How many #s are there? 	<ul style="list-style-type: none"> ▪ Explain Real Numbers ▪ Identify Rational vs Irrational #s ▪ Identify Integer vs Whole vs Counting Numbers 	Sep (review)	Homework Quizzes
	Order of Operations	<ul style="list-style-type: none"> ▪ Can you do operations in any order? 	Follow correct Order of Operations (PEMDAS)	Sep (review)	Homework Quizzes
	Properties & Systems	<ul style="list-style-type: none"> ▪ Can all properties be used with all operations? 	Correctly utilize properties in solving equations (i.e., commutative, associative, distributive, closure, identity, inverse, etc)	Sep (review)	Homework Quizzes
POLYNOMIALS and EXPONENTS	Variables	<ul style="list-style-type: none"> ▪ What is a variable? 	<ul style="list-style-type: none"> ▪ Variables in expressions/equations ▪ Explain algebraic terminology ▪ Explain why variables are used 	Sep (review)	Homework Quizzes
	Algebraic Expressions	<ul style="list-style-type: none"> ▪ What is a like term? 	<ul style="list-style-type: none"> ▪ Add / subtract / multiply / divide monomials and polynomials ▪ Explain like terms 	Sep (review)	Homework Quizzes
	Verbal Phrases	<ul style="list-style-type: none"> ▪ Twice a number means what? 	<ul style="list-style-type: none"> ▪ Translate verbal phrases into algebraic language ▪ Expressions vs Equations 	Sep (review)	Homework Quizzes
	Exponents	<ul style="list-style-type: none"> ▪ What does an exponent tell us to do? 	<ul style="list-style-type: none"> ▪ Identify base, power, exponent ▪ Multiply and divide variables with exponents ▪ Explain difference of positive and negative exponents <p>Explain significance of a power raised to a power</p>	Sep (review)	Homework Quizzes

	Scientific Notation	Why do we use scientific notation?	<ul style="list-style-type: none"> ▪ Rewrite large and/or small numbers using scientific notation ▪ Multiply / divide numbers written in scientific notation 	Sep (review)	Homework Quizzes UNIT TEST
FUNCTIONS	Domain / Range	▪ What is difference between domain and range?	<ul style="list-style-type: none"> ▪ Find domain and range of functions based on a graph, table or mapping ▪ Explain possible limits of each Write in interval notation	Sep (review)	Homework Quizzes
		▪ What is a function?	▪ Identify and explain what makes a relationship/equation a function	Sep (review)	Homework Quizzes
		▪ Explain vertical line test?	<ul style="list-style-type: none"> • Will be able to determine if a graph represents a function based on the vertical line test • 	Oct (review)	Homework Quizzes
		Are there more than one type of function?	Identify linear, quadratic and exponential functions based on a graph and/or equation.	Oct (review)	Homework Quizzes UNIT TEST
SOLVING LINEAR EQUATIONS and INEQUALITIES	Solving Equations	<ul style="list-style-type: none"> ◆ How do you solve equations? Is there more than one way to solve most problems?	<ul style="list-style-type: none"> ▪ Follow steps to solve one and two step equations ▪ Choose appropriate strategies ▪ Combine strategies (i.e.; clear fractions, set to zero, etc) Solve equations containing fractions and decimals	Oct (review)	Homework Quizzes
	Word Problems	▪ How does using variables help us solve problems?	<ul style="list-style-type: none"> • Translate verbal phrases into algebraic equations • Use equations to solve problems • Use "let" statements • 	Oct (review)	Homework Quizzes

	Properties	<ul style="list-style-type: none"> ◆ What is an inequality? How is it different? 	<ul style="list-style-type: none"> ▪ Identify inequalities in problems Use addition / subtraction / multiplication / division with inequalities 	Oct (review)	Homework Quizzes
	Solution Sets	How many points satisfy inequalities?	<ul style="list-style-type: none"> ▪ Determine solution sets of inequalities using properties ▪ Represent solution set on number line 	Oct (review)	Homework Quizzes UNIT TEST
GRAPHING EQUATIONS and INEQUALITIES	Coordinate Plane	Are coordinate planes used in real-life?	<ul style="list-style-type: none"> ▪ Graph using x- and y-axis ▪ Understand meaning of input variable and output variable (Dependent vs Independent variable) 	Oct (review)	Homework Quizzes
	Slope & Y-Intercept	<ul style="list-style-type: none"> ◆ What does the slope tell us? The y-intercept tells us what? 	<ul style="list-style-type: none"> ▪ Identify lines having positive / negative / zero / undefined slopes Identify parts of the linear equation $y = mx + b$ 	Oct (review)	Homework Quizzes
	Calculation of Slope	What can you tell by the slope?	<ul style="list-style-type: none"> ▪ Calculate slope of a line (Rise over Run , Rate of Change, Change of Y over Change of X) 	Oct (review)	Homework Quizzes
	Equations Of Lines	Can every line be shown by an equation?	<ul style="list-style-type: none"> ▪ Calculate equation of a line given 2 points or given 1 point and the slope Manipulate equations to get them into the form $y = mx + b$ 	Oct (review)	Homework Quizzes
	Graphing	How do we use the equation of a line to graph that line?	<ul style="list-style-type: none"> ▪ Graph lines with positive / negative / zero / undefined slope ▪ Identify slopes from visual representations of a line 	Oct (review)	Homework Quizzes
	Linear Relationships	What can the slope tell us about lines?	<ul style="list-style-type: none"> ▪ Identify lines that are parallel / perpendicular / vertical / horizontal by their slope 	Oct (review)	Homework Quizzes

	Graphing	Can we graph inequalities?	<ul style="list-style-type: none"> ▪ Use coordinate plane to show solution set of an inequality ▪ Understand meaning of a graph of an inequality 	Oct (review)	Homework Quizzes
	Word Problems	How does using variables help us solve problems?	<ul style="list-style-type: none"> ▪ Translate verbal phrases into algebraic equations ▪ Use equations to solve problems ▪ Use "let" statements 	Oct (review)	Homework Quizzes UNIT TEST
SYSTEMS of EQUATIONS and INEQUALITIES	Sets of Linear Equations	What is the difference between solving algebraically and graphically?	<ul style="list-style-type: none"> ▪ Solve system of equations using addition / substitution / graphing ▪ Understand trial and error is a valid process to solve equations 	Nov (review)	Homework Quizzes
		Is graphing a viable means for solving systems of equations?	<ul style="list-style-type: none"> ▪ Solve system of equations using the graphing method ▪ Understand where to find results 	Nov (review)	Homework Quizzes
		How can we solve systems of equations algebraically?	<ul style="list-style-type: none"> ▪ Solve system of equations using addition and substitution methods ▪ Utilize various algebraic methods to solve systems of equations 	Nov (review)	Homework Quizzes
	Sets of Inequalities	How do you show inequalities when graphing?	<ul style="list-style-type: none"> ▪ Solve compound inequalities ▪ Utilize proper procedures when dealing with inequalities (i.e., switching direction when multiplying or dividing by negative numbers) ▪ Understand solution sets 	Nov (review)	Homework Quizzes UNIT TEST
EXPONENTIAL EQUATIONS	Growth and Decay and Compound Interest	Identify what makes an equation exponential?	<ul style="list-style-type: none"> ▪ Identify individual formulas ▪ Input correct data into formulas ▪ Utilize calculator to solve for unknown 	Nov (review)	Homework Quizzes

			<ul style="list-style-type: none"> ▪ Graph exponential equations ▪ Identify whether exponential growth or decay equation through represented graph 	Nov (review)	Homework Quizzes UNIT TEST
SEQUENCES	Arithmetic and Geometric	What is a sequence?	<ul style="list-style-type: none"> ▪ Identify each sequence to its major category ▪ Develop functions based on a list of numbers ▪ Find any unknown term 	Dec (review)	Homework Quizzes UNIT TEST
FACTORING	Factoring Single Step	How are FOIL and factoring related?	<ul style="list-style-type: none"> ▪ Find Greatest Common Factor (GCF) ▪ Identify Difference of Two Perfect Squares ▪ Employ FOIL backwards / Master Product / Arc Method ▪ 	Dec	Homework Quizzes
	Factoring Multi-Step	What does factoring completely mean?	<ul style="list-style-type: none"> ▪ Use multi steps to break polynomials down to their prime factors ▪ Factor by Grouping ▪ 	Jan	Homework Quizzes UNIT TEST
MIDTERM EXAM					
RADICALS	Square Roots	How do we simplify radicals?	<ul style="list-style-type: none"> ▪ Identify perfect square radicals and simplify ▪ Identify non-perfect radicals and simplify 	Jan	Homework Quizzes
		Can we perform operations with radicals?	<ul style="list-style-type: none"> ▪ Add and subtract radicals and simplify result ▪ Multiply and divide radicals and simplify result 	Feb	Homework Quizzes

		Estimating values	Use calculator to find various roots of a radical	Feb	Homework Quizzes UNIT TEST
SOLVING QUADRATICS	Quadratic Equations	How does factoring help us solve verbal problems?	<ul style="list-style-type: none"> ▪ Identify quadratic equations ▪ Identify quadratics in Standard Form Factor quadratic equations	Feb	Homework Quizzes
	Solving Quadratics	<ul style="list-style-type: none"> ◆ Why do we set quadratic equal to zero? 	<ul style="list-style-type: none"> ▪ Manipulate equations to get into standard form ▪ Utilize factoring to solve equations (Roots vs Factors) ▪ Complete square to solve quadratic equations Derive and utilize the quadratic formula	Mar	Homework Quizzes
	Word Problems	<ul style="list-style-type: none"> ◆ Are there life problems that result in quadratic equations? 	<ul style="list-style-type: none"> ▪ Solve appropriate word problems ▪ Identify unrealistic results 	Mar	Homework Quizzes
GRAPH QUADRATICS	Graphing Quadratics	<ul style="list-style-type: none"> ◆ What does the graph show us? ◆ Is it a function? 	<ul style="list-style-type: none"> ▪ Utilize graphing calculator ▪ Identify points of interest (roots, vertex, axis of symmetry) ▪ Identify minimum and maximum points if appropriate ▪ Explain what changing coefficient values do to the graph ▪ Write equations based on roots 	Mar	Homework Quizzes
	Quadratic and Linear System of Equations	<ul style="list-style-type: none"> ◆ How many possible solutions are there? 	<ul style="list-style-type: none"> ▪ Solve Algebraically ▪ Solve Graphically 	Mar	Homework Quizzes UNIT TEST
	Word Problems	<ul style="list-style-type: none"> ◆ Are there life problems that result in quadratic 	<ul style="list-style-type: none"> ▪ Solve appropriate word problems ▪ Identify unrealistic results 	Mar	Homework Quizzes

		equations?			
UNIVARIATE STATISTICS	Statistics Measuring One Variable	◆ What is meant by univariate data?	<ul style="list-style-type: none"> ▪ Develop box-plot, histograms, and dot plots from data 	Apr	Homework Quizzes
		◆	<ul style="list-style-type: none"> ▪ Find mean, median, mode of data ▪ Find standard deviation ▪ Identify normal/skewed distribution ▪ 		Homework Quizzes
	Word Problems	◆ Are there life problems that result in quadratic equations?	<ul style="list-style-type: none"> ▪ Solve appropriate word problems ▪ Identify unrealistic results 	Apr	Homework Quizzes UNIT TEST
BIVARIATE STATISTICS	Statistics Measuring Two Variables	◆ What is meant by bivariate data?	<ul style="list-style-type: none"> ▪ Develop two-way tables ▪ Develop scatter plots from data ▪ Find residuals ▪ 	May	Homework Quizzes
	Word Problems	◆ Are there life problems that result in quadratic equations?	<ul style="list-style-type: none"> ▪ Solve appropriate word problems ▪ Identify unrealistic results 	May	Homework Quizzes UNIT TEST
MIXED FUNCTIONS	Other Functions	◆ What other types of functions may we come in contact with?	<ul style="list-style-type: none"> ▪ Graph various functions ▪ Graph Cubic, Absolute Value, Step, Piece-wise functions ▪ Calculate and identify linear, exponential, and quadratic regression 	May	Homework Quizzes

		<ul style="list-style-type: none"> ◆ How can we change the shape of a graph? 	<ul style="list-style-type: none"> ▪ Identify changes when coefficient change ▪ Identify changes when we add or subtract numbers inside or outside the function 	Jun	Homework Quizzes UNIT TEST
		<ul style="list-style-type: none"> ◆ 	<ul style="list-style-type: none"> ▪ Month of June also used for review 		
		<ul style="list-style-type: none"> ◆ 	<ul style="list-style-type: none"> ▪ NEW YORK STATE COMMON CORE ALGEBRA 1 REGENTS EXAM 		

COURSE: Geometry
GRADE LEVEL: 10th Grade

***Reviewing Old Skills and Practicing New Skills**
Introducing New Skills
Mastering Skills

MAIN/GENERAL TOPIC:	SUB-TOPIC:	ESSENTIAL QUESTIONS:	*	WHAT THE STUDENTS WILL KNOW OR BE ABLE TO DO:	SKILLS:	WHEN STUDENT DOES IT:	ASSESSMENTS:
BASIC GEOMETRY (GG # 1-9) (GG #30-37) (GG # 35)	Vocabulary	<ul style="list-style-type: none"> How can you survive in Geometry without the knowledge of the proper vocabulary? 	R M	<ul style="list-style-type: none"> Utilize basic vocabulary necessary for Geometry Interpret terms and notation (point, ray, line, plane, line segment) Recognize if lines are parallel, perpendicular or neither Identify types of angles based on their measurements 	<ul style="list-style-type: none"> Define and draw a diagram of a given geometric term Identify three basic undefined geometric terms 	Sep	<ul style="list-style-type: none"> Homework Quiz
COORDINATE GEOMETRY (GG # 35-46) (GG # 62-74)	Coordinate Plane	<ul style="list-style-type: none"> Can you plot points on a coordinate plane? 	R I M	<ul style="list-style-type: none"> Students can identify x-axis, y-axis and quadrants Students can plot using different scales on the x-axis and y-axis 	<ul style="list-style-type: none"> Plot on the coordinate plane 	Sep	Homework
	Line equations	<ul style="list-style-type: none"> Explain what the slope and y-intercept of a line tell us 	R I M	<ul style="list-style-type: none"> Identify lines with zero, undefined, positive, or negative slope Graph lines knowing slope and y-intercept 	<ul style="list-style-type: none"> Graph lines knowing slope and y-intercept 	Sep	Homework
		<ul style="list-style-type: none"> Can you calculate the slope of a line or line segment using the slope formula? 	R I M	<ul style="list-style-type: none"> Utilize change in y values over the change in x values as the slope 	<ul style="list-style-type: none"> Calculate slope 	Sep	Homework
		<ul style="list-style-type: none"> How do you find the equation of a line in the form $y = mx + b$? 	R I M	<ul style="list-style-type: none"> Find the equation of a given line when 2 points are given or when a point and slope is given. 	<ul style="list-style-type: none"> Use point-slope or slope intercept formulas to find equations of lines 	Sep	Homework Quiz
		<ul style="list-style-type: none"> Can a student explain what the slope and y-intercept of a line tell us 	R I M	<ul style="list-style-type: none"> Identify lines with zero, undefined, positive, or negative slope Graph lines knowing slope and y-intercept 	<ul style="list-style-type: none"> Graph lines knowing slope and y-intercept 	Sep	Homework

		<ul style="list-style-type: none"> • Can you calculate the slope of a line or line segment using the slope formula? 	R I M	<ul style="list-style-type: none"> • Utilize change in y values over the change in x values as the slope 	<ul style="list-style-type: none"> • Calculate slope 	Sep	Homework
		<ul style="list-style-type: none"> • Can you use the slope of a line to determine if the lines are parallel or perpendicular? 	R I M	<ul style="list-style-type: none"> • Find the equation of a parallel or perpendicular line given a point and a line 	<ul style="list-style-type: none"> • Calculate using known slopes 	Sep	Homework Quiz
	Systems of Equations	<ul style="list-style-type: none"> • Can you solve a systems of equations with two unknowns? 	R I	<ul style="list-style-type: none"> • Solve a system of equations to find coordinates of points that represent the intersection of geometric figures 	<ul style="list-style-type: none"> • Solve systems graphically and algebraically 	Sep	Homework Quiz
POLYGONS	Parallel Lines cut by a Transversal	<ul style="list-style-type: none"> • What are the relationships of the angles when parallel lines are cut by a transversal or when cut by a perpendicular transversal? 	R M	<ul style="list-style-type: none"> • Use parallel lines to find congruent angles on a transversal • Identify Alternate Interior, Alternate Exterior, Corresponding, and Vertical Angles • Identify Supplementary Angles • Identify Complementary Angles 	<ul style="list-style-type: none"> • Identify and find special angles formed by parallel lines cut by a transversal 	Sep	<ul style="list-style-type: none"> • Homework • Quiz
	Shapes (2-dimensional polygons)	<ul style="list-style-type: none"> • Can a student differentiate one polygon from another using their properties? 	R I	<ul style="list-style-type: none"> • Identify general category of a polygon (triangle, quadrilateral, pentagon, etc) 	<ul style="list-style-type: none"> • Differentiate between polygons given various criteria 	Sep	Homework
	Triangles, Quads, Pentagons Hexagons etc	<ul style="list-style-type: none"> • Can a student categorize polygons that are not triangles or quadrilaterals? 	I M	<ul style="list-style-type: none"> • Identify polygons based on number of sides, number of angles, or angle measurements 	<ul style="list-style-type: none"> • Recite relationship between number of sides and angle measurements of polygons 	Sep	Homework
		<ul style="list-style-type: none"> • Does a student realize any polygon can be partitioned into triangles? 	R I	<ul style="list-style-type: none"> • Determine how to partition polygons into triangles to compute angle measurements 	<ul style="list-style-type: none"> • Determine number of triangles contained in various polygons 	Sep	Homework

		<ul style="list-style-type: none"> • Give a rule for the sum of the interior angles of a polygon? 	I	<ul style="list-style-type: none"> • Determine the total interior degrees found in a polygon using the formula: $180(n-2)$ 	<ul style="list-style-type: none"> • Compute angle sums of interior angles 	Sep	Homework
		<ul style="list-style-type: none"> • Give a rule about the sum measurements of the exterior angles of a polygon? 	I	<ul style="list-style-type: none"> • Conceptualize that the sum of the exterior angles of all polygons is 360 degrees 	<ul style="list-style-type: none"> • Comprehend commonality between exterior angles of polygons 	Sep	Homework
		<ul style="list-style-type: none"> • Can you categorize a regular polygon if given either an interior or exterior angle measurement? 	I	<ul style="list-style-type: none"> • Given the measurement of an exterior or interior angle, student can determine which type of regular polygon 	<ul style="list-style-type: none"> • Determine which regular polygon using sum of exterior angles is 360 degrees 	Sep	Homework
		<ul style="list-style-type: none"> • Can you use the interior and exterior angles to determine type of polygon? 	I	<ul style="list-style-type: none"> • Compare and contrast interior and exterior angle measurements of polygons 	<ul style="list-style-type: none"> • Calculate interior and exterior angle measurements 		Homework Quiz UNIT TEST 1
TRIANGLES	Properties of Triangles	<ul style="list-style-type: none"> • Can you explain the property that holds true for interior angles of every triangle? 	R I M	<ul style="list-style-type: none"> • Determine angle measurements in a triangle given information on triangle classifications by using algebraic expressions 	<ul style="list-style-type: none"> • Use the fact that the interior angles of a triangle must add up to 180 degrees 	Oct	Homework
		<ul style="list-style-type: none"> • Can you explain the property that holds true for exterior angles of every triangle? 	I	<ul style="list-style-type: none"> • Determine the sum of the exterior angles of a triangle • Determine measurement of specific exterior angles based on interior angles 	<ul style="list-style-type: none"> • Compute sum of the exterior angles • Identify remote interior angles to find measure of exterior angle 	Oct	Homework
		<ul style="list-style-type: none"> • Can you explain the property that holds true for the sides of every triangle? 	I	<ul style="list-style-type: none"> • Determine that the sum of any two sides must be greater than the third side 	<ul style="list-style-type: none"> • Compare the lengths of the sides of triangles 	Oct	Homework

		<ul style="list-style-type: none"> • Can a student identify categories of triangles based on side and/or angle measurements? 	R I M	<ul style="list-style-type: none"> • Identify various categories of triangles based on angle or side measurements • Utilize both categories to give triangles specific names 	<ul style="list-style-type: none"> • Identify triangles as acute scalene, acute isosceles, etc 	Oct	Homework
		<ul style="list-style-type: none"> • Can a student identify altitudes, angle bisectors, and medians of a triangle? 	R I	<ul style="list-style-type: none"> • Show relationships between altitudes and medians of different types of triangles • Explain what an altitude, angle bisector or median does within a triangle 	<ul style="list-style-type: none"> • Determine if a given line segment is an angle bisector, altitude or median 	Oct	Homework
		<ul style="list-style-type: none"> • Give a general rule that holds true for every right triangle 	R I	<ul style="list-style-type: none"> • Students will be able to use the Pythagorean Theorem • Students will be able to compute missing leg or hypotenuse 	<ul style="list-style-type: none"> • Use Pythagorean Theorem to find any missing side of a right triangle 	Oct	Homework
		<ul style="list-style-type: none"> • Give measurements of the sides of special right triangles? 	I	<ul style="list-style-type: none"> • Recognize side relationships of 30-60-90 and 45-45-90 right triangles 	<ul style="list-style-type: none"> • Identify side measurements of 30-60-90 and 45-45-90 right triangles 	Oct	Homework Quiz
		<ul style="list-style-type: none"> • How do you write the equation for an altitude, median, perpendicular or angle bisector in isosceles or equilateral triangles? 	R I	<ul style="list-style-type: none"> • Find equation of lines using $y=mx+b$ or $(y-y_1)=m(x-x_1)$ for perpendicular and angle bisectors, altitudes, and medians 	<ul style="list-style-type: none"> • Use point-slope or slope intercept formulas to find equations of lines 	Oct	Homework Quiz
	Coordinate Area of Triangles	<ul style="list-style-type: none"> • How do you find area and perimeter of triangles in the coordinate plane? 	R I	<ul style="list-style-type: none"> • Recognize needed line segments • Calculate length of line segments • Utilize correct area formulas • Use the "box-in" technique to find the area of any polygon graphed on the coordinate plane 	<ul style="list-style-type: none"> • Calculate area of given shapes 	Oct	Homework
							UNIT TEST 2

QUADRILATERALS	Properties of Quadrilaterals	<ul style="list-style-type: none"> • Can a student categorize quadrilaterals based on family relationships 	R I	<ul style="list-style-type: none"> • Place quadrilaterals in specific categories based on angle and/or side relationships • Construct flowchart of quadrilateral relationships 	<ul style="list-style-type: none"> • Compare and contrast quadrilaterals based on their properties 	Oct	Homework
		<ul style="list-style-type: none"> • Explain the property that holds true for the interior angles of every quadrilateral? 	R I M	<ul style="list-style-type: none"> • Visualize and explain that a quadrilateral is made up of two triangles 	<ul style="list-style-type: none"> • Compute the sum of the interior angles of a quadrilateral 	Oct	Homework
		<ul style="list-style-type: none"> • Explain the property that holds true for the exterior angles of every quadrilateral? 	R I	<ul style="list-style-type: none"> • Identify adjacent interior and exterior angles to compute sum of exterior angles 	<ul style="list-style-type: none"> • Compute the sum of the exterior angles of a quadrilateral 	Oct-Nov	Homework
		<ul style="list-style-type: none"> • Can a student identify properties of a parallelogram? 	R I M	<ul style="list-style-type: none"> • List and explain properties of a parallelogram 	<ul style="list-style-type: none"> • Determine if quadrilateral is a parallelogram 	Oct-Nov	Homework
		<ul style="list-style-type: none"> • Can a student identify properties of a rectangle? 	R I M	<ul style="list-style-type: none"> • List and explain properties of a rectangle 	<ul style="list-style-type: none"> • Determine if quadrilateral is a rectangle 	Oct-Nov	Homework
		<ul style="list-style-type: none"> • Can a student identify properties of a rhombus? 	R I	<ul style="list-style-type: none"> • List and explain properties of a rhombus 	<ul style="list-style-type: none"> • Determine if quadrilateral is a rhombus 	Oct-Nov	Homework
		<ul style="list-style-type: none"> • Can a student identify properties of a square? 	R I	<ul style="list-style-type: none"> • List and explain properties of a square 	<ul style="list-style-type: none"> • Determine if quadrilateral is a square 	Nov	Homework
		<ul style="list-style-type: none"> • Can a student identify properties of a kite? 	R I	<ul style="list-style-type: none"> • List and explain properties of a kite 	<ul style="list-style-type: none"> • Determine if quadrilateral is a kite 	Nov	Homework

		<ul style="list-style-type: none"> • Can a student identify properties of a trapezoid and isosceles trapezoid? 	R I	<ul style="list-style-type: none"> • List and explain properties of a trapezoid 	<ul style="list-style-type: none"> • Determine if quadrilateral is a trapezoid or an isosceles trapezoid 	Nov	Homework
		<ul style="list-style-type: none"> • Can a student identify differences between parallelograms, trapezoids and kites? 	R I	<ul style="list-style-type: none"> • Logically arrange shapes into their proper category 	<ul style="list-style-type: none"> • Follow a logical path to classify shapes 	Nov	Homework
	Coordinate Area of Quadrilaterals	<ul style="list-style-type: none"> • How do you find area and perimeter of quadrilaterals in the coordinate plane? 	R I	<ul style="list-style-type: none"> • Recognize needed line segments • Calculate length of line segments • Utilize correct area formulas • Use “box-in” technique to find area of polygons on coordinate plane 	<ul style="list-style-type: none"> • Calculate area of given shapes 	Nov	Homework UNIT TEST 3
COORDINATE PROOFS	Coordinate Proofs	<ul style="list-style-type: none"> • How do you do a coordinate proof? 	I	<ul style="list-style-type: none"> • Apply midpoint, slope and distance formulas to gather evidence for proofs in coordinate geometry 	<ul style="list-style-type: none"> • Use appropriate conclusions for coordinate geometry proofs. 	Dec	Homework
		<ul style="list-style-type: none"> • Can you calculate the length of a line segment? 	I	<ul style="list-style-type: none"> • Utilize distance formula to calculate length 	<ul style="list-style-type: none"> • Calculate the length of a line segment 	Dec	Homework
		<ul style="list-style-type: none"> • Can you calculate the midpoint of a line segment? 	I	<ul style="list-style-type: none"> • Utilize midpoint formula to find the midpoint or an endpoint if given the midpoint 	<ul style="list-style-type: none"> • Calculate midpoint and endpoints of a line segment 	Dec	Homework
	Parallelogram	<ul style="list-style-type: none"> • How do you prove a quadrilateral is a parallelogram? 	R I	<ul style="list-style-type: none"> • Identify parallelogram properties • Use properties of parallel lines and parallelograms to prove a quadrilateral is a parallelogram • Use properties of a parallelogram to do an analytic proof 	<ul style="list-style-type: none"> • Do a parallelogram proof 	Dec	Homework

	Rectangle	<ul style="list-style-type: none"> How do you prove a parallelogram is a rectangle? 	R I	<ul style="list-style-type: none"> Apply properties of a rectangle to prove a quadrilateral is a rectangle Use properties of a rectangle to do an analytic proof 	<ul style="list-style-type: none"> Prove a parallelogram is a rectangle 	Dec	Homework
	Rhombus	<ul style="list-style-type: none"> How do you prove a parallelogram is a rhombus? 	R I	<ul style="list-style-type: none"> Apply properties of a rhombus to prove a quadrilateral is a rhombus Use properties of a rhombus to do an analytic proof 	<ul style="list-style-type: none"> Do a rhombus proof 	Dec	Homework
	Square	<ul style="list-style-type: none"> How can you prove a quadrilateral is a square? 	R I	<ul style="list-style-type: none"> Apply properties of a square to prove a quadrilateral is a square Use properties of a square to do an analytic proof 	<ul style="list-style-type: none"> Prove a rhombus or rectangle is a square 	Dec	Homework
	Trapezoid	<ul style="list-style-type: none"> How can you prove a quadrilateral is a trapezoid? 	R I	<ul style="list-style-type: none"> Apply properties of trapezoids to prove a quadrilateral is a trapezoid or isosceles trapezoid 	<ul style="list-style-type: none"> Prove a quadrilateral is an trapezoid or an isosceles trapezoid 	Dec	Homework
		<ul style="list-style-type: none"> How is an isosceles trapezoid similar to an isosceles triangle? 	R I	<ul style="list-style-type: none"> Use properties of a trapezoid or isosceles trapezoid to do an analytic proof 	<ul style="list-style-type: none"> Prove a quadrilateral is an trapezoid or an isosceles trapezoid 	Dec	Homework UNIT TEST 4
CIRCLES (GG # 49-53)	Geomezody of the Circle	<ul style="list-style-type: none"> Can you define and identify parts of the circle? 	R I	<ul style="list-style-type: none"> Define and identify center, radius, and diameter 	<ul style="list-style-type: none"> Identify interior parts of a circle 	Dec	<ul style="list-style-type: none"> Homework
		<ul style="list-style-type: none"> How do you find the center and radius from the equation of a circle 	R I	<ul style="list-style-type: none"> Write equation of a circle drawn in coordinate plane $(x-h)^2 + (y-k)^2 = r^2$ 	<ul style="list-style-type: none"> Use formula and find equation of circle. 	Dec	<ul style="list-style-type: none"> Homework
		<ul style="list-style-type: none"> How do you find the equation of a circle given the center and a point on the circle? 	R I	<ul style="list-style-type: none"> Write equation of a circle drawn in coordinate plane $(x-h)^2 + (y-k)^2 = r^2$ 	<ul style="list-style-type: none"> Use formula and find equation of circle. 	Dec	<ul style="list-style-type: none"> Homework

		<ul style="list-style-type: none"> • Can you determine the equation of a circle given the graph of the circle? 	I	<ul style="list-style-type: none"> • Interpret graph of a circle to find the center point and radius 	<ul style="list-style-type: none"> • Use knowledge of coordinate plane to find center and radius 	Dec	<ul style="list-style-type: none"> • Homework
		<ul style="list-style-type: none"> • Determine equation of a circle given the endpoints of the diameter. 	I	<ul style="list-style-type: none"> • Utilize midpoint of a line segment and circle equation 	<ul style="list-style-type: none"> • Utilize prior knowledge of circles and line segments 	Dec	<ul style="list-style-type: none"> • Homework
TRANSFORMATIONS (GG # 54-61)	Transformational Geometry	<ul style="list-style-type: none"> • How can you identify and perform transformations in the coordinate plane? 	R I	<ul style="list-style-type: none"> • Define and apply isometries in the plane (rotations, reflections, translations, glide reflections) 	<ul style="list-style-type: none"> • Read, Identify and draw appropriate transformations in function notations 	Jan	<ul style="list-style-type: none"> • Homework
		<ul style="list-style-type: none"> • Can you identify transformation by properties? 	R I	<ul style="list-style-type: none"> • Interpret transformation notations • Compare properties of object and their image 	<ul style="list-style-type: none"> • Perform transformations in coordinate plane 	Jan	<ul style="list-style-type: none"> • Homework
		<ul style="list-style-type: none"> • How can you identify properties that remain the same with isometries in a plane? 	I	<ul style="list-style-type: none"> • Investigate, justify, and apply the properties that remain invariant under translations, rotations, reflections, and glide reflections 	<ul style="list-style-type: none"> • Identify and explain properties that do not change under isometries 	Jan	<ul style="list-style-type: none"> • Homework
		<ul style="list-style-type: none"> • How do you determine the difference between direct and opposite isometries? 	I	<ul style="list-style-type: none"> • Identify specific isometries by observing orientation, numbers of invariant points, and/or parallelism 	<ul style="list-style-type: none"> • Recognize differences in orientation 	Jan	<ul style="list-style-type: none"> • Homework
		<ul style="list-style-type: none"> • How do you recognize invariant properties under similarity? 	I	<ul style="list-style-type: none"> • Investigate, justify, and apply the properties that remain invariant under similarities • Identify similarities by observing orientation, numbers of invariant points, and/or parallelism 	<ul style="list-style-type: none"> • Identify properties in dilations that remain unchanged and apply to graphing transformations 	Jan	<ul style="list-style-type: none"> • Homework

		<ul style="list-style-type: none"> • Perform rotations graphically using geometric notations? 	R I	<ul style="list-style-type: none"> • Investigate and apply the analytical representations for rotations about the origin of 90° and 180°. 	<ul style="list-style-type: none"> • Graph and analyze problem solving situations 	Jan	<ul style="list-style-type: none"> • Homework
		<ul style="list-style-type: none"> • How do you perform translations graphically using geometric notations? 	R I	<ul style="list-style-type: none"> • Investigate and apply the analytical representations for translations, rotations about the origin of 90° and 180°, reflections over the lines of $x=0$, $y=0$, $y=x$, $y=-x$, point reflections and dilations centered at the origin 	<ul style="list-style-type: none"> • Analyze problem solving situations and illustrate graphically 	Jan	<ul style="list-style-type: none"> • Homework
		<ul style="list-style-type: none"> • How do you perform reflections graphically using geometric notations? 	R I	<ul style="list-style-type: none"> • Investigate, justify, and apply the analytical representations for reflections over the lines of $x=0$, $y=0$, $y=x$, $y=-x$, and point reflections centered at the origin 	<ul style="list-style-type: none"> • Analyze problem solving situations and illustrate graphically 	Jan	<ul style="list-style-type: none"> • Homework
		<ul style="list-style-type: none"> • How do you perform dilations graphically using geometric notations? 	R I	<ul style="list-style-type: none"> • Investigate, justify, and apply the analytical representations for dilations centered at the origin 	<ul style="list-style-type: none"> • Analyze problem solving situations and illustrate graphically 	Jan	<ul style="list-style-type: none"> • Homework
		<ul style="list-style-type: none"> • What transformations show perpendicularity, parallelism, and congruence? 	R I	<ul style="list-style-type: none"> • Justify geometric relationships (perpendicularity, parallelism, congruence) using transformational techniques (translations, rotations, reflections) 	<ul style="list-style-type: none"> • Determine and sketch geometric relationships between the pre-image and image 	Jan	<ul style="list-style-type: none"> • Homework
		<ul style="list-style-type: none"> • How do you recognize and graph dilations and the composition of transformations? 	R I	<ul style="list-style-type: none"> • Define, investigate, justify, and apply similarities (dilations and the composition of dilations and isometries) 	<ul style="list-style-type: none"> • Draw pre-image and image after dilations, and composition of transformations 	Jan	<ul style="list-style-type: none"> • Homework
UNIT TEST 6							

Review For Local-Written Mid-term

CONSTRUCTION AND LOCUS (GG # 17-23)	Locus, Constructions & Concurrency	<ul style="list-style-type: none"> • Can you solve a pirate map to find the buried treasure? 	I	<ul style="list-style-type: none"> • Graph the six basic locus situations • Graph and solve compound loci problems 	<ul style="list-style-type: none"> • Draw and solve simple and compound loci situations 	Feb	<ul style="list-style-type: none"> • Homework
		<ul style="list-style-type: none"> • How do you use a compass to construct geometric ideas? 	I	<ul style="list-style-type: none"> • Construct angle bisectors, perpendicular bisectors, lines parallel or perpendicular to a line and equilateral triangles 	<ul style="list-style-type: none"> • Use a compass and straightedge to do a construction 	Feb	<ul style="list-style-type: none"> • Homework
		<ul style="list-style-type: none"> • What is the difference between a centroid, orthocenter, incenter & circumcenter ? 	I	<ul style="list-style-type: none"> • Apply concurrence to medians, altitudes, angle bisectors and perpendicular bisectors in triangles 	<ul style="list-style-type: none"> • Find the “Big Four” concurrences by construction 	Feb	<ul style="list-style-type: none"> • Homework
LOGIC (GG # 24-27)	Logic	<ul style="list-style-type: none"> • Can a student determine the truth value of a statement? 	I	<ul style="list-style-type: none"> • Students will be able to interpret negations, conjunctions, disjunctions, conditional and bi-conditional statements 	<ul style="list-style-type: none"> • Determine the truth value of a statement 	Feb	<ul style="list-style-type: none"> • Homework
		<ul style="list-style-type: none"> • Can a student determine if statements are logically equivalent? 	I	<ul style="list-style-type: none"> • Write and determine which statements are logically equivalent (inverse, converse, and contrapositive of statements) 	<ul style="list-style-type: none"> • Determine equivalence of a statements 	Feb	<ul style="list-style-type: none"> • Homework
CONGRUENCY VS SIMILARITY (GG # 28-31) (GG # 41-48)	Congruent and Similar Polygons	<ul style="list-style-type: none"> • What makes polygons congruent? 	R I	<ul style="list-style-type: none"> • Determine if polygons are congruent by identifying corresponding parts are congruent 	<ul style="list-style-type: none"> • Identify corresponding parts of congruent polygons 	Mar	<ul style="list-style-type: none"> • Homework
		<ul style="list-style-type: none"> • What makes polygons similar? 	R I	<ul style="list-style-type: none"> • Determine polygons are similar by identifying corresponding angles are equal and corresponding sides are in a constant ratio 	<ul style="list-style-type: none"> • Compute ratio of sides to determine if constant (ratio of similitude) 	Mar	<ul style="list-style-type: none"> • Homework
		<ul style="list-style-type: none"> • How do you show triangles are congruent? 	R I	<ul style="list-style-type: none"> • Determine congruence of two triangles by using one of the five congruence theorems • Identify corresponding parts of 	<ul style="list-style-type: none"> • Use SSS, SAS, ASA, AAS or HL to prove triangles congruent 	Mar	<ul style="list-style-type: none"> • Homework

				congruent triangles (CPCTC)	<ul style="list-style-type: none"> Identify congruent parts using CPCTC 		
		<ul style="list-style-type: none"> How do you show triangles are similar? 	R I	<ul style="list-style-type: none"> Determine similarity of triangles by congruent angles or by showing a constant side measurement ratio 	<ul style="list-style-type: none"> Use AA or constant ratio of corresponding sides to show triangle similarity 	Mar	Homework
		<ul style="list-style-type: none"> What is a geometric mean or mean proportional of a right triangle? 	I	<ul style="list-style-type: none"> Apply proportions of similar right triangles to compute length of altitude and/or line segments 	<ul style="list-style-type: none"> Use proportions to calculate length of altitude and sides of triangles 	Mar	Homework
		<ul style="list-style-type: none"> How do you organize thoughts in a basic statement-reason proof? 	I	<ul style="list-style-type: none"> Use statement-reason format to prove triangles are congruent (two separate or two overlapping triangles) 	<ul style="list-style-type: none"> Justify statements with valid reasoning 	Mar	Homework
		<ul style="list-style-type: none"> Can we follow statement-reason proofs to determine validity? 	I	<ul style="list-style-type: none"> Use a statement-reason format to prove triangles are similar (two separate or two overlapping triangles) 	<ul style="list-style-type: none"> Follow step-by-step reasoning in proofs 	Mar	Homework UNIT TEST 9
EUCLIDEAN PROOF (GRP # 1-9)	Direct Proofs	<ul style="list-style-type: none"> What do you need in order to prove your hypothesis is correct? 	I	<ul style="list-style-type: none"> Use calculated or given information to eliminate possible choices 	<ul style="list-style-type: none"> Use Statement / Reason chart to organize step-by-step approach 	Mar-Apr	Homework
	Indirect Proofs	<ul style="list-style-type: none"> How is an indirect proof different from a direct proof? 	I	<ul style="list-style-type: none"> Investigate and apply theorems for proof by contradiction 	<ul style="list-style-type: none"> Use any definitions or theorem to develop proof by contradiction 	Apr	Homework UNIT TEST 10

CIRCLES (GG # 49-53)	Geometry of the Circle	<ul style="list-style-type: none"> Can you define and identify parts of the circle? 	R I	<ul style="list-style-type: none"> Define and identify radius, diameter, arcs, chords, tangent segments, secant segments 	<ul style="list-style-type: none"> Identify parts of a circle and lines and segments associated with a circle 	Apr	<ul style="list-style-type: none"> Homework
		<ul style="list-style-type: none"> How do you find the center and radius from the equation of a circle 	R I	<ul style="list-style-type: none"> Write equation of a circle drawn in coordinate plane $(x-h)^2 + (y-k)^2 = r^2$ 	<ul style="list-style-type: none"> Use formula and find equation of circle. 	Apr	<ul style="list-style-type: none"> Homework
		<ul style="list-style-type: none"> How do you apply theorems, definitions and postulates to find the measurements of angles and arcs within a circle? 	R I	<ul style="list-style-type: none"> Find measurements of central and inscribed angles Find measurement of angles formed by two chords Find measurement of arcs formed by chords 	<ul style="list-style-type: none"> Calculate angle and arc measurements 	Apr	<ul style="list-style-type: none"> Homework Quiz
		<ul style="list-style-type: none"> How do you find the measurements of exterior angles and arcs formed by tangents and secants? 	I	<ul style="list-style-type: none"> Find measurement of angles formed by tangents and secants Find measurement of arcs formed by tangents and secants 	<ul style="list-style-type: none"> Calculate arc and angle measurements 	Apr	<ul style="list-style-type: none"> Homework
		<ul style="list-style-type: none"> How do you find the measurements of line segments formed by intersecting chords? 	I	<ul style="list-style-type: none"> Utilize product of the lengths of the line segments of one chord is equal to the product of the lengths of the other chord 	<ul style="list-style-type: none"> Calculate length of line segments 	Apr-May	<ul style="list-style-type: none"> Homework Quiz
		<ul style="list-style-type: none"> How do you find the measurements of line segments formed by secants? 	I	<ul style="list-style-type: none"> Utilize product of the length of one secant and its external segment is equal to the product of the length of the other secant and its external segment 	<ul style="list-style-type: none"> Calculate length of line segments 	May	<ul style="list-style-type: none"> Homework
		<ul style="list-style-type: none"> How do you find the measurements of line segments formed by a secant and a tangent? 	I	<ul style="list-style-type: none"> Utilize product of the length of the secant and its external segment is equal to the square of the length of the tangent 	<ul style="list-style-type: none"> Calculate length of line segments 	May	<ul style="list-style-type: none"> Homework

		<ul style="list-style-type: none"> • How do you find the measurements of line segments formed by two tangents? 	I	<ul style="list-style-type: none"> • Recognize length of two tangents from an external point are equal 	<ul style="list-style-type: none"> • Recognize length of intersecting tangents are equal 	May	<ul style="list-style-type: none"> • Homework • Quiz
		<ul style="list-style-type: none"> • Is there a relationship between a common tangent to two non-intersecting circles? 	I	<ul style="list-style-type: none"> • Investigate numbers of tangents that satisfy given criteria (a single circle, two non-intersecting circles or two tangent circles) 	<ul style="list-style-type: none"> • Explain tangent relationships to circles 	May	<ul style="list-style-type: none"> • Homework
		<ul style="list-style-type: none"> • Is there a relationship between a common tangent to two tangent circles? 	I	<ul style="list-style-type: none"> • Investigate numbers of tangents that satisfy given criteria (a single circle, two non-intersecting circles or two tangent circles) 	<ul style="list-style-type: none"> • Explain tangent relationships to circles 	May	<ul style="list-style-type: none"> • Homework
		<ul style="list-style-type: none"> • What is relationship of the measurement of arcs cut by parallel lines? 	I	<ul style="list-style-type: none"> • Realize arcs cut by parallel lines are congruent 	<ul style="list-style-type: none"> • Find measurement of arcs cut by parallel lines 	May	<ul style="list-style-type: none"> • Homework UNIT TEST 11
3-DIMENSIONAL OBJECTS (GG # 1-9)	3-dimensional objects formed from points, lines, and planes	<ul style="list-style-type: none"> • Can you visualize objects formed by the intersection of points, lines and planes in 3-dimensions? 	I	<ul style="list-style-type: none"> • Apply if a line is perpendicular to each of two intersecting lines at their point of intersection, then the line is perpendicular to the plane determined by them • Apply through a given point there passes one and only one plane perpendicular to a given line • Apply through a given point there passes one and only one line perpendicular to a given plane • Apply two lines perpendicular to the same plane are parallel • Apply two planes are perpendicular to each other if and only if one plane contains a line perpendicular to the second plane • Apply if a line is perpendicular to a plane, then any line perpendicular 	<ul style="list-style-type: none"> • Employ spatial reasoning to analyze characteristics and properties of geometric shapes 	May	<ul style="list-style-type: none"> • Homework • Quiz

				<p>to the line at its point of intersection with the plane is in the given plane</p> <ul style="list-style-type: none"> • Apply if a line is perpendicular to a plane, then every plane containing the line is perpendicular to the given plane • Apply if a plane intersects two parallel planes, then the intersection is two parallel lines • Apply if two planes are perpendicular to the same line, they are parallel 			
SOLIDS (GG # 10-16)	Solids	<ul style="list-style-type: none"> • Can you identify the characteristics of a prism? 	R I	<ul style="list-style-type: none"> • Explain the characteristics of a prism to include that the bases are congruent and the lateral edges are congruent and parallel 	<ul style="list-style-type: none"> • Show relationships between prisms using formulas and measurements 	May	Homework
		<ul style="list-style-type: none"> • Can you identify the characteristics of a pyramid? 	R I	<ul style="list-style-type: none"> • Explain the characteristics of a pyramid to include lateral edges are congruent and the lateral faces are congruent isosceles triangles • Explain difference between altitude and slant height 	<ul style="list-style-type: none"> • Show relationships between different pyramids using formulas and measurements 	May	Homework
		<ul style="list-style-type: none"> • Can you identify the characteristics of a sphere? 	I	<ul style="list-style-type: none"> • Explain the characteristics of a sphere to include the intersection of a plane and a sphere is a circle and a “great circle” is the largest circle that can be drawn on a sphere 	<ul style="list-style-type: none"> • Show relationships between different spheres using formulas and measurements 	May	Homework
		<ul style="list-style-type: none"> • Can you differentiate between surface area, lateral area, and volume 	R I	<ul style="list-style-type: none"> • Reason as to which we are being asked to find (area vs volume) 	<ul style="list-style-type: none"> • Explain area and volume measurements 	May	Homework

		<ul style="list-style-type: none"> • How do you find surface area, lateral area, and volume of solids? 	R I	<ul style="list-style-type: none"> • Use proper formulas to determine correct measurements 	<ul style="list-style-type: none"> • Employ formulas 	May	Homework
		<ul style="list-style-type: none"> • Can different shapes have the same area or the same volume? 	R I	<ul style="list-style-type: none"> • Use formulas to compare volumes, surface area and lateral area of different shapes 	<ul style="list-style-type: none"> • Employ formulas and relationships 	May	Homework UNIT TEST 12
<p>Regents Review May – June NYS Regents Exam in Geometry</p>							

COURSE: Introduction to Geometry
GRADE LEVEL: 11th Grade

*Reviewing Old Skills and Practicing New Skills
Introducing New Skills
Mastering Skills

MAIN/GENERAL TOPIC:	SUB-TOPIC:	ESSENTIAL QUESTIONS:	*	WHAT THE STUDENTS WILL KNOW OR BE ABLE TO DO:	SKILLS:	WHEN STUDENT DOES IT:	ASSESSMENTS:
BASIC GEOMETRY (GG # 1-9) (GG #30-37) (GG # 35)	Vocabulary	<ul style="list-style-type: none"> • How can you survive in Geometry without the knowledge of the proper vocabulary? 	R M	<ul style="list-style-type: none"> • Utilize basic vocabulary necessary for Geometry • Interpret terms and notation (point, ray, line, plane, line segment) • Recognize if lines are parallel, 	<ul style="list-style-type: none"> • Define and draw a diagram of a given geometric term • Identify three basic undefined 	Sep	<ul style="list-style-type: none"> • Homework • Quiz

				<ul style="list-style-type: none"> perpendicular or neither Identify types of angles based on their measurements 	geometric terms		
COORDINATE GEOMETRY (GG # 35-46) (GG # 62-74)	Coordinate Plane	<ul style="list-style-type: none"> Can you plot points on a coordinate plane? 	R I M	<ul style="list-style-type: none"> Students can identify x-axis, y-axis and quadrants Students can plot using different scales on the x-axis and y-axis 	<ul style="list-style-type: none"> Plot on the coordinate plane 	Sep	Homework
	Line equations	<ul style="list-style-type: none"> Explain what the slope and y-intercept of a line tell us 	R I M	<ul style="list-style-type: none"> Identify lines with zero, undefined, positive, or negative slope Graph lines knowing slope and y-intercept 	<ul style="list-style-type: none"> Graph lines knowing slope and y-intercept 	Sep	Homework
		<ul style="list-style-type: none"> Can you calculate the slope of a line or line segment using the slope formula? 	R I M	<ul style="list-style-type: none"> Utilize change in y values over the change in x values as the slope 	<ul style="list-style-type: none"> Calculate slope 	Sep	Homework
		<ul style="list-style-type: none"> How do you find the equation of a line in the form $y = mx + b$? 	R I M	<ul style="list-style-type: none"> Find the equation of a given line when 2 points are given or when a point and slope is given. 	<ul style="list-style-type: none"> Use point-slope or slope intercept formulas to find equations of lines 	Sep	Homework Quiz
		<ul style="list-style-type: none"> Can a student explain what the slope and y-intercept of a line tell us 	R I M	<ul style="list-style-type: none"> Identify lines with zero, undefined, positive, or negative slope Graph lines knowing slope and y-intercept 	<ul style="list-style-type: none"> Graph lines knowing slope and y-intercept 	Sep	Homework
		<ul style="list-style-type: none"> Can you calculate the slope of a line or line segment using the slope formula? 	R I M	<ul style="list-style-type: none"> Utilize change in y values over the change in x values as the slope 	<ul style="list-style-type: none"> Calculate slope 	Sep	Homework
		<ul style="list-style-type: none"> Can you use the slope of a line to determine if the lines are parallel or perpendicular? 	R I M	<ul style="list-style-type: none"> Find the equation of a parallel or perpendicular line given a point and a line 	<ul style="list-style-type: none"> Calculate using known slopes 	Sep	Homework Quiz

	Systems of Equations	<ul style="list-style-type: none"> • Can you solve a systems of equations with two unknowns? 	R I	<ul style="list-style-type: none"> • Solve a system of equations to find coordinates of points that represent the intersection of geometric figures 	<ul style="list-style-type: none"> • Solve systems graphically and algebraically 	Sep	Homework Quiz
POLYGONS	Parallel Lines cut by a Transversal	<ul style="list-style-type: none"> • What are the relationships of the angles when parallel lines are cut by a transversal or when cut by a perpendicular transversal? 	R I	<ul style="list-style-type: none"> • Use parallel lines to find congruent angles on a transversal • Identify Alternate Interior, Alternate Exterior, Corresponding, and Vertical Angles • Identify Supplementary Angles • Identify Complementary Angles 	<ul style="list-style-type: none"> • Identify and find special angles formed by parallel lines cut by a transversal 	Sep	<ul style="list-style-type: none"> • Homework • Quiz
	Shapes (2-dimensional polygons)	<ul style="list-style-type: none"> • Can a student differentiate one polygon from another using their properties? 	R I	<ul style="list-style-type: none"> • Identify general category of a polygon (triangle, quadrilateral, pentagon , etc) 	<ul style="list-style-type: none"> • Differentiate between polygons given various criteria 	Sep	Homework
	Triangles, Quads, Pentagons Hexagons etc	<ul style="list-style-type: none"> • Can a student categorize polygons that are not triangles or quadrilaterals? 	I M	<ul style="list-style-type: none"> • Identify polygons based on number of sides, number of angles, or angle measurements 	<ul style="list-style-type: none"> • Recite relationship between number of sides and angle measurements of polygons 	Sep	Homework
		<ul style="list-style-type: none"> • Does a student realize any polygon can be partitioned into triangles? 	R I	<ul style="list-style-type: none"> • Determine how to partition polygons into triangles to compute angle measurements 	<ul style="list-style-type: none"> • Determine number of triangles contained in various polygons 	Sep	Homework
		<ul style="list-style-type: none"> • Give a rule for the sum of the interior angles of a polygon? 	I	<ul style="list-style-type: none"> • Determine the total interior degrees found in a polygon using the formula: $180(n-2)$ 	<ul style="list-style-type: none"> • Compute angle sums of interior angles 	Sep	Homework
		<ul style="list-style-type: none"> • Give a rule about the sum measurements of the exterior angles of a polygon? 	I	<ul style="list-style-type: none"> • Conceptualize that the sum of the exterior angles of all polygons is 360 degrees 	<ul style="list-style-type: none"> • Comprehend commonality between exterior angles of polygons 	Sep	Homework

		<ul style="list-style-type: none"> • Can you categorize a regular polygon if given either an interior or exterior angle measurement? 	I	<ul style="list-style-type: none"> • Given the measurement of an exterior or interior angle, student can determine which type of regular polygon 	<ul style="list-style-type: none"> • Determine which regular polygon using sum of exterior angles is 360 degrees 	Sep	Homework
		<ul style="list-style-type: none"> • Can you use the interior and exterior angles to determine type of polygon? 	I	<ul style="list-style-type: none"> • Compare and contrast interior and exterior angle measurements of polygons 	<ul style="list-style-type: none"> • Calculate interior and exterior angle measurements 		Homework Quiz
							UNIT TEST 1
TRIANGLES	Properties of Triangles	<ul style="list-style-type: none"> • Can you explain the property that holds true for interior angles of every triangle? 	R I M	<ul style="list-style-type: none"> • Determine angle measurements in a triangle given information on triangle classifications by using algebraic expressions 	<ul style="list-style-type: none"> • Use the fact that the interior angles of a triangle must add up to 180 degrees 	Oct	Homework
		<ul style="list-style-type: none"> • Can you explain the property that holds true for exterior angles of every triangle? 	I	<ul style="list-style-type: none"> • Determine the sum of the exterior angles of a triangle • Determine measurement of specific exterior angles based on interior angles 	<ul style="list-style-type: none"> • Compute sum of the exterior angles • Identify remote interior angles to find measure of exterior angle 	Oct	Homework
		<ul style="list-style-type: none"> • Can you explain the property that holds true for the sides of every triangle? 	I	<ul style="list-style-type: none"> • Determine that the sum of any two sides must be greater than the third side 	<ul style="list-style-type: none"> • Compare the lengths of the sides of triangles 	Oct	Homework
		<ul style="list-style-type: none"> • Can a student identify categories of triangles based on side and/or angle measurements? 	R I M	<ul style="list-style-type: none"> • Identify various categories of triangles based on angle or side measurements • Utilize both categories to give triangles specific names 	<ul style="list-style-type: none"> • Identify triangles as acute scalene, acute isosceles, etc 	Oct	Homework
		<ul style="list-style-type: none"> • Can a student identify altitudes, angle bisectors, and medians of a triangle? 	R I	<ul style="list-style-type: none"> • Show relationships between altitudes and medians of different types of triangles • Explain what an altitude, angle 	<ul style="list-style-type: none"> • Determine if a given line segment is an angle bisector, altitude or 	Oct	Homework

				bisector or median does within a triangle	median		
		<ul style="list-style-type: none"> • Give a general rule that holds true for every right triangle 	R I	<ul style="list-style-type: none"> • Students will be able to use the Pythagorean Theorem • Students will be able to compute missing leg or hypotenuse 	<ul style="list-style-type: none"> • Use Pythagorean Theorem to find any missing side of a right triangle 	Oct	Homework
		<ul style="list-style-type: none"> • Give measurements of the sides of special right triangles? 	I	<ul style="list-style-type: none"> • Recognize side relationships of 30-60-90 and 45-45-90 right triangles 	<ul style="list-style-type: none"> • Identify side measurements of 30-60-90 and 45-45-90 right triangles 	Oct	Homework Quiz
		<ul style="list-style-type: none"> • How do you write the equation for an altitude, median, perpendicular or angle bisector in isosceles or equilateral triangles? 	R I	<ul style="list-style-type: none"> • Find equation of lines using $y=mx+b$ or $(y-y_1)=m(x-x_1)$ for perpendicular and angle bisectors, altitudes, and medians 	<ul style="list-style-type: none"> • Use point-slope or slope intercept formulas to find equations of lines 	Oct	Homework Quiz
	Coordinate Area of Triangles	<ul style="list-style-type: none"> • How do you find area and perimeter of triangles in the coordinate plane? 	R I	<ul style="list-style-type: none"> • Recognize needed line segments • Calculate length of line segments • Utilize correct area formulas • Use the "box-in" technique to find the area of any polygon graphed on the coordinate plane 	<ul style="list-style-type: none"> • Calculate area of given shapes 	Oct	Homework
							UNIT TEST 2
QUADRILATERALS	Properties of Quadrilaterals	<ul style="list-style-type: none"> • Can a student categorize quadrilaterals based on family relationships 	R I	<ul style="list-style-type: none"> • Place quadrilaterals in specific categories based on angle and/or side relationships • Construct flowchart of quadrilateral relationships 	<ul style="list-style-type: none"> • Compare and contrast quadrilaterals based on their properties 	Oct	Homework

		<ul style="list-style-type: none"> • Explain the property that holds true for the interior angles of every quadrilateral? 	R I M	<ul style="list-style-type: none"> • Visualize and explain that a quadrilateral is made up of two triangles 	<ul style="list-style-type: none"> • Compute the sum of the interior angles of a quadrilateral 	Oct	Homework
		<ul style="list-style-type: none"> • Explain the property that holds true for the exterior angles of every quadrilateral? 	R I	<ul style="list-style-type: none"> • Identify adjacent interior and exterior angles to compute sum of exterior angles 	<ul style="list-style-type: none"> • Compute the sum of the exterior angles of a quadrilateral 	Oct-Nov	Homework
		<ul style="list-style-type: none"> • Can a student identify properties of a parallelogram? 	R I M	<ul style="list-style-type: none"> • List and explain properties of a parallelogram 	<ul style="list-style-type: none"> • Determine if quadrilateral is a parallelogram 	Oct-Nov	Homework
		<ul style="list-style-type: none"> • Can a student identify properties of a rectangle? 	R I M	<ul style="list-style-type: none"> • List and explain properties of a rectangle 	<ul style="list-style-type: none"> • Determine if quadrilateral is a rectangle 	Oct-Nov	Homework
		<ul style="list-style-type: none"> • Can a student identify properties of a rhombus? 	R I	<ul style="list-style-type: none"> • List and explain properties of a rhombus 	<ul style="list-style-type: none"> • Determine if quadrilateral is a rhombus 	Oct-Nov	Homework
		<ul style="list-style-type: none"> • Can a student identify properties of a square? 	R I	<ul style="list-style-type: none"> • List and explain properties of a square 	<ul style="list-style-type: none"> • Determine if quadrilateral is a square 	Nov	Homework
		<ul style="list-style-type: none"> • Can a student identify properties of a kite? 	R I	<ul style="list-style-type: none"> • List and explain properties of a kite 	<ul style="list-style-type: none"> • Determine if quadrilateral is a kite 	Nov	Homework
		<ul style="list-style-type: none"> • Can a student identify properties of a trapezoid and isosceles trapezoid? 	R I	<ul style="list-style-type: none"> • List and explain properties of a trapezoid 	<ul style="list-style-type: none"> • Determine if quadrilateral is a trapezoid or an isosceles trapezoid 	Nov	Homework

		<ul style="list-style-type: none"> • Can a student identify differences between parallelograms, trapezoids and kites? 	R I	<ul style="list-style-type: none"> • Logically arrange shapes into their proper category 	<ul style="list-style-type: none"> • Follow a logical path to classify shapes 	Nov	Homework
	Coordinate Area of Quadrilaterals	<ul style="list-style-type: none"> • How do you find area and perimeter of quadrilaterals in the coordinate plane? 	R I	<ul style="list-style-type: none"> • Recognize needed line segments • Calculate length of line segments • Utilize correct area formulas • Use “box-in” technique to find area of polygons on coordinate plane 	<ul style="list-style-type: none"> • Calculate area of given shapes 	Nov	Homework UNIT TEST 3
COORDINATE PROOFS	Coordinate Proofs	<ul style="list-style-type: none"> • How do you do a coordinate proof? 	I	<ul style="list-style-type: none"> • Apply midpoint, slope and distance formulas to gather evidence for proofs in coordinate geometry 	<ul style="list-style-type: none"> • Use appropriate conclusions for coordinate geometry proofs. 	Dec	Homework
		<ul style="list-style-type: none"> • Can you calculate the length of a line segment? 	I	<ul style="list-style-type: none"> • Utilize distance formula to calculate length 	<ul style="list-style-type: none"> • Calculate the length of a line segment 	Dec	Homework
		<ul style="list-style-type: none"> • Can you calculate the midpoint of a line segment? 	I	<ul style="list-style-type: none"> • Utilize midpoint formula to find the midpoint or an endpoint if given the midpoint 	<ul style="list-style-type: none"> • Calculate midpoint and endpoints of a line segment 	Dec	Homework
	Parallelogram	<ul style="list-style-type: none"> • How do you prove a quadrilateral is a parallelogram? 	R I	<ul style="list-style-type: none"> • Identify parallelogram properties • Use properties of parallel lines and parallelograms to prove a quadrilateral is a parallelogram • Use properties of a parallelogram to do an analytic proof 	<ul style="list-style-type: none"> • Do a parallelogram proof 	Dec	Homework
	Rectangle	<ul style="list-style-type: none"> • How do you prove a parallelogram is a rectangle? 	R I	<ul style="list-style-type: none"> • Apply properties of a rectangle to prove a quadrilateral is a rectangle • Use properties of a rectangle to do an analytic proof 	<ul style="list-style-type: none"> • Prove a parallelogram is a rectangle 	Dec	Homework

	Rhombus	<ul style="list-style-type: none"> How do you prove a parallelogram is a rhombus? 	R I	<ul style="list-style-type: none"> Apply properties of a rhombus to prove a quadrilateral is a rhombus Use properties of a rhombus to do an analytic proof 	<ul style="list-style-type: none"> Do a rhombus proof 	Dec	Homework
	Square	<ul style="list-style-type: none"> How can you prove a quadrilateral is a square? 	R I	<ul style="list-style-type: none"> Apply properties of a square to prove a quadrilateral is a square Use properties of a square to do an analytic proof 	<ul style="list-style-type: none"> Prove a rhombus or rectangle is a square 	Dec	Homework
	Trapezoid	<ul style="list-style-type: none"> How can you prove a quadrilateral is a trapezoid? 	R I	<ul style="list-style-type: none"> Apply properties of trapezoids to prove a quadrilateral is a trapezoid or isosceles trapezoid 	<ul style="list-style-type: none"> Prove a quadrilateral is an trapezoid or an isosceles trapezoid 	Dec	Homework
		<ul style="list-style-type: none"> How is an isosceles trapezoid similar to an isosceles triangle? 	R I	<ul style="list-style-type: none"> Use properties of a trapezoid or isosceles trapezoid to do an analytic proof 	<ul style="list-style-type: none"> Prove a quadrilateral is an trapezoid or an isosceles trapezoid 	Dec	Homework UNIT TEST 4
CIRCLES (GG # 49-53)	Geometry of the Circle	<ul style="list-style-type: none"> Can you define and identify parts of the circle? 	R I	<ul style="list-style-type: none"> Define and identify center, radius, and diameter 	<ul style="list-style-type: none"> Identify interior parts of a circle 	Dec	<ul style="list-style-type: none"> Homework
		<ul style="list-style-type: none"> How do you find the center and radius from the equation of a circle 	R I	<ul style="list-style-type: none"> Write equation of a circle drawn in coordinate plane $(x-h)^2 + (y-k)^2 = r^2$ 	<ul style="list-style-type: none"> Use formula and find equation of circle. 	Dec	<ul style="list-style-type: none"> Homework
		<ul style="list-style-type: none"> How do you find the equation of a circle given the center and a point on the circle? 	R I	<ul style="list-style-type: none"> Write equation of a circle drawn in coordinate plane $(x-h)^2 + (y-k)^2 = r^2$ 	<ul style="list-style-type: none"> Use formula and find equation of circle. 	Dec	<ul style="list-style-type: none"> Homework
		<ul style="list-style-type: none"> Can you determine the equation of a circle given the graph of the circle? 	I	<ul style="list-style-type: none"> Interpret graph of a circle to find the center point and radius 	<ul style="list-style-type: none"> Use knowledge of coordinate plane to find center and radius 	Dec	<ul style="list-style-type: none"> Homework

		<ul style="list-style-type: none"> Determine equation of a circle given the endpoints of the diameter. 	I	<ul style="list-style-type: none"> Utilize midpoint of a line segment and circle equation 	<ul style="list-style-type: none"> Utilize prior knowledge of circles and line segments 	Dec	<ul style="list-style-type: none"> Homework
TRANSFORMATIONS (GG # 54-61)	Transformational Geometry	<ul style="list-style-type: none"> How can you identify and perform transformations in the coordinate plane? 	R I	<ul style="list-style-type: none"> Define and apply isometries in the plane (rotations, reflections, translations, glide reflections) 	<ul style="list-style-type: none"> Read, Identify and draw appropriate transformations in function notations 	Jan	<ul style="list-style-type: none"> Homework
		<ul style="list-style-type: none"> Can you identify transformation by properties? 	R I	<ul style="list-style-type: none"> Interpret transformation notations Compare properties of object and their image 	<ul style="list-style-type: none"> Perform transformations in coordinate plane 	Jan	<ul style="list-style-type: none"> Homework
		<ul style="list-style-type: none"> How can you identify properties that remain the same with isometries in a plane? 	I	<ul style="list-style-type: none"> Investigate, justify, and apply the properties that remain invariant under translations, rotations, reflections, and glide reflections 	<ul style="list-style-type: none"> Identify and explain properties that do not change under isometries 	Jan	<ul style="list-style-type: none"> Homework
		<ul style="list-style-type: none"> How do you determine the difference between direct and opposite isometries? 	I	<ul style="list-style-type: none"> Identify specific isometries by observing orientation, numbers of invariant points, and/or parallelism 	<ul style="list-style-type: none"> Recognize differences in orientation 	Jan	<ul style="list-style-type: none"> Homework
		<ul style="list-style-type: none"> How do you recognize invariant properties under similarity? 	I	<ul style="list-style-type: none"> Investigate, justify, and apply the properties that remain invariant under similarities Identify similarities by observing orientation, numbers of invariant points, and/or parallelism 	<ul style="list-style-type: none"> Identify properties in dilations that remain unchanged and apply to graphing transformations 	Jan	<ul style="list-style-type: none"> Homework
		<ul style="list-style-type: none"> Perform rotations graphically using geometric notations? 	R I	<ul style="list-style-type: none"> Investigate and apply the analytical representations for rotations about the origin of 90° and 180°. 	<ul style="list-style-type: none"> Graph and analyze problem solving situations 	Jan	<ul style="list-style-type: none"> Homework

		<ul style="list-style-type: none"> How do you perform translations graphically using geometric notations? 	R I	<ul style="list-style-type: none"> Investigate and apply the analytical representations for translations, rotations about the origin of 90° and 180°, reflections over the lines of $x=0$, $y=0$, $y=x$, $y=-x$, point reflections and dilations centered at the origin 	<ul style="list-style-type: none"> Analyze problem solving situations and illustrate graphically 	Jan	<ul style="list-style-type: none"> Homework
		<ul style="list-style-type: none"> How do you perform reflections graphically using geometric notations? 	R I	<ul style="list-style-type: none"> Investigate, justify, and apply the analytical representations for reflections over the lines of $x=0$, $y=0$, $y=x$, $y=-x$, and point reflections centered at the origin 	<ul style="list-style-type: none"> Analyze problem solving situations and illustrate graphically 	Jan	<ul style="list-style-type: none"> Homework
		<ul style="list-style-type: none"> How do you perform dilations graphically using geometric notations? 	R I	<ul style="list-style-type: none"> Investigate, justify, and apply the analytical representations for dilations centered at the origin 	<ul style="list-style-type: none"> Analyze problem solving situations and illustrate graphically 	Jan	<ul style="list-style-type: none"> Homework
		<ul style="list-style-type: none"> What transformations show perpendicularity, parallelism, and congruence? 	R I	<ul style="list-style-type: none"> Justify geometric relationships (perpendicularity, parallelism, congruence) using transformational techniques (translations, rotations, reflections) 	<ul style="list-style-type: none"> Determine and sketch geometric relationships between the pre-image and image 	Jan	<ul style="list-style-type: none"> Homework
		<ul style="list-style-type: none"> How do you recognize and graph dilations and the composition of transformations? 	R I	<ul style="list-style-type: none"> Define, investigate, justify, and apply similarities (dilations and the composition of dilations and isometries) 	<ul style="list-style-type: none"> Draw pre-image and image after dilations, and composition of transformations 	Jan	<ul style="list-style-type: none"> Homework
<p>UNIT TEST 6</p>							
<p>Review For Local-Written Mid-term</p>							
CONSTRUCTION AND LOCUS (GG # 17-23)	Locus, Constructions & Concurrency	<ul style="list-style-type: none"> Can you solve a pirate map to find the buried treasure? 	I	<ul style="list-style-type: none"> Graph the six basic locus situations Graph and solve compound loci problems 	<ul style="list-style-type: none"> Draw and solve simple and compound loci situations 	Feb	<ul style="list-style-type: none"> Homework

		<ul style="list-style-type: none"> How do you use a compass to construct geometric ideas? 	I	<ul style="list-style-type: none"> Construct angle bisectors, perpendicular bisectors, lines parallel or perpendicular to a line and equilateral triangles 	<ul style="list-style-type: none"> Use a compass and straightedge to do a construction 	Feb	<ul style="list-style-type: none"> Homework
		<ul style="list-style-type: none"> What is the difference between a centroid, orthocenter, incenter & circumcenter ? 	I	<ul style="list-style-type: none"> Apply concurrence to medians, altitudes, angle bisectors and perpendicular bisectors in triangles 	<ul style="list-style-type: none"> Find the “Big Four” concurrences by construction 	Feb	<ul style="list-style-type: none"> Homework UNIT TEST 7
LOGIC (GG # 24-27)	Logic	<ul style="list-style-type: none"> Can a student determine the truth value of a statement? 	I	<ul style="list-style-type: none"> Students will be able to interpret negations, conjunctions, disjunctions, conditional and bi-conditional statements 	<ul style="list-style-type: none"> Determine the truth value of a statement 	Feb	Homework
		<ul style="list-style-type: none"> Can a student determine if statements are logically equivalent? 	I	<ul style="list-style-type: none"> Write and determine which statements are logically equivalent (inverse, converse, and contrapositive of statements) 	<ul style="list-style-type: none"> Determine equivalence of a statements 	Feb	Homework UNIT TEST 8
CONGRUENCY VS SIMILARITY (GG # 28-31) (GG # 41-48)	Congruent and Similar Polygons	<ul style="list-style-type: none"> What makes polygons congruent? 	R I	<ul style="list-style-type: none"> Determine if polygons are congruent by identifying corresponding parts are congruent 	<ul style="list-style-type: none"> Identify corresponding parts of congruent polygons 	Mar	Homework
		<ul style="list-style-type: none"> What makes polygons similar? 	R I	<ul style="list-style-type: none"> Determine polygons are similar by identifying corresponding angles are equal and corresponding sides are in a constant ratio 	<ul style="list-style-type: none"> Compute ratio of sides to determine if constant (ratio of similitude) 	Mar	Homework
		<ul style="list-style-type: none"> How do you show triangles are congruent? 	R I	<ul style="list-style-type: none"> Determine congruence of two triangles by using one of the five congruence theorems Identify corresponding parts of congruent triangles (CPCTC) 	<ul style="list-style-type: none"> Use SSS, SAS, ASA, AAS or HL to prove triangles congruent Identify congruent parts using CPCTC 	Mar	Homework

		<ul style="list-style-type: none"> • How do you show triangles are similar? 	R I	<ul style="list-style-type: none"> • Determine similarity of triangles by congruent angles or by showing a constant side measurement ratio 	<ul style="list-style-type: none"> • Use AA or constant ratio of corresponding sides to show triangle similarity 	Mar	Homework
		<ul style="list-style-type: none"> • What is a geometric mean or mean proportional of a right triangle? 	I	<ul style="list-style-type: none"> • Apply proportions of similar right triangles to compute length of altitude and/or line segments 	<ul style="list-style-type: none"> • Use proportions to calculate length of altitude and sides of triangles 	Mar	Homework
		<ul style="list-style-type: none"> • How do you organize thoughts in a basic statement-reason proof? 	I	<ul style="list-style-type: none"> • Use statement-reason format to prove triangles are congruent (two separate or two overlapping triangles) 	<ul style="list-style-type: none"> • Justify statements with valid reasoning 	Mar	Homework
		<ul style="list-style-type: none"> • Can we follow statement-reason proofs to determine validity? 	I	<ul style="list-style-type: none"> • Use a statement-reason format to prove triangles are similar (two separate or two overlapping triangles) 	<ul style="list-style-type: none"> • Follow step-by-step reasoning in proofs 	Mar	Homework UNIT TEST 9
EUCLIDEAN PROOF (GRP # 1-9)	Direct Proofs	<ul style="list-style-type: none"> • What do you need in order to prove your hypothesis is correct? 	I	<ul style="list-style-type: none"> • Use calculated or given information to eliminate possible choices 	<ul style="list-style-type: none"> • Use Statement / Reason chart to organize step-by-step approach 	Mar-Apr	Homework
	Indirect Proofs	<ul style="list-style-type: none"> • How is an indirect proof different from a direct proof? 	I	<ul style="list-style-type: none"> • Investigate and apply theorems for proof by contradiction 	<ul style="list-style-type: none"> • Use any definitions or theorem to develop proof by contradiction 	Apr	Homework UNIT TEST 10
CIRCLES (GG # 49-53)	Geometry of the Circle	<ul style="list-style-type: none"> • Can you define and identify parts of the circle? 	R I	<ul style="list-style-type: none"> • Define and identify radius, diameter, arcs, chords, tangent segments, secant segments 	<ul style="list-style-type: none"> • Identify parts of a circle and lines and segments associated with a circle 	Apr	• Homework

		<ul style="list-style-type: none"> How do you find the center and radius from the equation of a circle 	R I	<ul style="list-style-type: none"> Write equation of a circle drawn in coordinate plane $(x-h)^2 + (y-k)^2 = r^2$ 	<ul style="list-style-type: none"> Use formula and find equation of circle. 	Apr	<ul style="list-style-type: none"> Homework
		<ul style="list-style-type: none"> How do you apply theorems, definitions and postulates to find the measurements of angles and arcs within a circle? 	R I	<ul style="list-style-type: none"> Find measurements of central and inscribed angles Find measurement of angles formed by two chords Find measurement of arcs formed by chords 	<ul style="list-style-type: none"> Calculate angle and arc measurements 	Apr	<ul style="list-style-type: none"> Homework Quiz
		<ul style="list-style-type: none"> How do you find the measurements of exterior angles and arcs formed by tangents and secants? 	I	<ul style="list-style-type: none"> Find measurement of angles formed by tangents and secants Find measurement of arcs formed by tangents and secants 	<ul style="list-style-type: none"> Calculate arc and angle measurements 	Apr	<ul style="list-style-type: none"> Homework
		<ul style="list-style-type: none"> How do you find the measurements of line segments formed by intersecting chords? 	I	<ul style="list-style-type: none"> Utilize product of the lengths of the line segments of one chord is equal to the product of the lengths of the other chord 	<ul style="list-style-type: none"> Calculate length of line segments 	Apr-May	<ul style="list-style-type: none"> Homework Quiz
		<ul style="list-style-type: none"> How do you find the measurements of line segments formed by secants? 	I	<ul style="list-style-type: none"> Utilize product of the length of one secant and its external segment is equal to the product of the length of the other secant and its external segment 	<ul style="list-style-type: none"> Calculate length of line segments 	May	<ul style="list-style-type: none"> Homework
		<ul style="list-style-type: none"> How do you find the measurements of line segments formed by a secant and a tangent? 	I	<ul style="list-style-type: none"> Utilize product of the length of the secant and its external segment is equal to the square of the length of the tangent 	<ul style="list-style-type: none"> Calculate length of line segments 	May	<ul style="list-style-type: none"> Homework
		<ul style="list-style-type: none"> How do you find the measurements of line segments formed by two tangents? 	I	<ul style="list-style-type: none"> Recognize length of two tangents from an external point are equal 	<ul style="list-style-type: none"> Recognize length of intersecting tangents are equal 	May	<ul style="list-style-type: none"> Homework Quiz

		<ul style="list-style-type: none"> • Is there a relationship between a common tangent to two non-intersecting circles? 	I	<ul style="list-style-type: none"> • Investigate numbers of tangents that satisfy given criteria (a single circle, two non-intersecting circles or two tangent circles) 	<ul style="list-style-type: none"> • Explain tangent relationships to circles 	May	<ul style="list-style-type: none"> • Homework
		<ul style="list-style-type: none"> • Is there a relationship between a common tangent to two tangent circles? 	I	<ul style="list-style-type: none"> • Investigate numbers of tangents that satisfy given criteria (a single circle, two non-intersecting circles or two tangent circles) 	<ul style="list-style-type: none"> • Explain tangent relationships to circles 	May	<ul style="list-style-type: none"> • Homework
		<ul style="list-style-type: none"> • What is relationship of the measurement of arcs cut by parallel lines? 	I	<ul style="list-style-type: none"> • Realize arcs cut by parallel lines are congruent 	<ul style="list-style-type: none"> • Find measurement of arcs cut by parallel lines 	May	<ul style="list-style-type: none"> • Homework
							UNIT TEST 11
3-DIMENSIONAL OBJECTS (GG # 1-9)	3-dimensional objects formed from points, lines, and planes	<ul style="list-style-type: none"> • Can you visualize objects formed by the intersection of points, lines and planes in 3-dimensions? 	I	<ul style="list-style-type: none"> • Apply if a line is perpendicular to each of two intersecting lines at their point of intersection, then the line is perpendicular to the plane determined by them • Apply through a given point there passes one and only one plane perpendicular to a given line • Apply through a given point there passes one and only one line perpendicular to a given plane • Apply two lines perpendicular to the same plane are parallel • Apply two planes are perpendicular to each other if and only if one plane contains a line perpendicular to the second plane • Apply if a line is perpendicular to a plane, then any line perpendicular to the line at its point of intersection with the plane is in the given plane • Apply if a line is perpendicular to a plane, then every plane containing the line is perpendicular to the given 	<ul style="list-style-type: none"> • Employ spatial reasoning to analyze characteristics and properties of geometric shapes 	May	<ul style="list-style-type: none"> • Homework • Quiz

				<p>plane</p> <ul style="list-style-type: none"> • Apply if a plane intersects two parallel planes, then the intersection is two parallel lines • Apply if two planes are perpendicular to the same line, they are parallel 			
SOLIDS (GG # 10-16)	Solids	<ul style="list-style-type: none"> • Can you identify the characteristics of a prism? 	R I	<ul style="list-style-type: none"> • Explain the characteristics of a prism to include that the bases are congruent and the lateral edges are congruent and parallel 	<ul style="list-style-type: none"> • Show relationships between prisms using formulas and measurements 	May	Homework
		<ul style="list-style-type: none"> • Can you identify the characteristics of a pyramid? 	R I	<ul style="list-style-type: none"> • Explain the characteristics of a pyramid to include lateral edges are congruent and the lateral faces are congruent isosceles triangles • Explain difference between altitude and slant height 	<ul style="list-style-type: none"> • Show relationships between different pyramids using formulas and measurements 	May	Homework
		<ul style="list-style-type: none"> • Can you identify the characteristics of a sphere? 	I	<ul style="list-style-type: none"> • Explain the characteristics of a sphere to include the intersection of a plane and a sphere is a circle and a “great circle” is the largest circle that can be drawn on a sphere 	<ul style="list-style-type: none"> • Show relationships between different spheres using formulas and measurements 	May	Homework
		<ul style="list-style-type: none"> • Can you differentiate between surface area, lateral area, and volume 	R I	<ul style="list-style-type: none"> • Reason as to which we are being asked to find (area vs volume) 	<ul style="list-style-type: none"> • Explain area and volume measurements 	May	Homework
		<ul style="list-style-type: none"> • How do you find surface area, lateral area, and volume of solids? 	R I	<ul style="list-style-type: none"> • Use proper formulas to determine correct measurements 	<ul style="list-style-type: none"> • Employ formulas 	May	Homework
		<ul style="list-style-type: none"> • Can different shapes have the same area or the same volume? 	R I	<ul style="list-style-type: none"> • Use formulas to compare volumes, surface area and lateral area of different shapes 	<ul style="list-style-type: none"> • Employ formulas and relationships 	May	Homework

							UNIT TEST 12
Review May – June Local Written Final Exam in Geometry							

COURSE: Algebra 2 (CCCS)

GRADE LEVEL: 11th Grade

MAIN/GENERAL TOPIC:	SUB-TOPIC:	ESSENTIAL QUESTIONS:	WHAT THE STUDENTS WILL KNOW OR BE ABLE TO DO:	SKILLS:	WHEN STUDENT DOES IT:	ASSESSMENTS:
UNIT 1 - POLYNOMIALS	DEFINE POLYNOMIAL - VOCABULARY (BASIC)	<ul style="list-style-type: none"> • WHAT IS THE DEGREE OF A POLYNOMIAL? • WHAT ARE A MONOMIAL, A BINOMIAL, A TRINOMIAL, AND A POLYNOMIAL? 	<ul style="list-style-type: none"> • DETERMINE THE DEGREE OF A POLYNOMIAL. • DEFINE MONOMIAL, BINOMIAL, TRINOMIAL, POLYNOMIAL. • PUT A POLYNOMIAL IN STANDARD FORM. 	<ul style="list-style-type: none"> • WRITE THE DEGREE AND TYPE OF A POLYNOMIAL IN STANDARD FORM 	SEPTEMBER	<ul style="list-style-type: none"> • MINI QUIZZES
	ADD, SUBTRACT, MULTIPLY POLYNOMIALS	<ul style="list-style-type: none"> • HOW DO WE ADD, SUBTRACT, AND MULTIPLY, POLYNOMIALS? 	<ul style="list-style-type: none"> • FIND THE SUM, DIFFERENCE, PRODUCT, QUOTIENT OF POLYNOMIAL EXPRESSIONS CONTAINING RATIONAL COEFFICIENTS. • 	<ul style="list-style-type: none"> • ADD, SUBTRACT, MULTIPLY POLYNOMIALS USING LAWS OF EXPONENTS 		<ul style="list-style-type: none"> • MINI QUIZZES
	Factoring Polynomials	<ul style="list-style-type: none"> • How do we factor polynomial expressions completely? 	<ul style="list-style-type: none"> • Factor polynomial expressions completely using any combination of GCF, difference of squares, and reverse FOIL and by grouping. • Factor perfect cubes. 	<ul style="list-style-type: none"> • Factor binomials and trinomials 		<ul style="list-style-type: none"> • Quiz
	Division of polynomials	<ul style="list-style-type: none"> • How do we divide with polynomials? 	<ul style="list-style-type: none"> • Simplifying and factoring when dividing rational expressions. 	<ul style="list-style-type: none"> • Simplify in lowest terms. 		<ul style="list-style-type: none"> • Daily homework
	Rational Expressions	<ul style="list-style-type: none"> • What is a rational expression? • How do we add, subtract, multiply and divide rational expressions? 	<ul style="list-style-type: none"> • Identify a rational expression. • Find the sum, difference, product, quotient of rational expressions. 	<ul style="list-style-type: none"> • Use all operations on rational expressions 		<ul style="list-style-type: none"> • mini quiz
	Long Division	<ul style="list-style-type: none"> • How do we use long division to determine factors of a polynomial? 	<ul style="list-style-type: none"> • Rewrite simple rational expressions in different forms; write $a(x)/b(x)$ in the form $q(x) + r(x)/b(x)$, where $a(x)$, $b(x)$, $q(x)$, and $r(x)$ are polynomials with the degree of $r(x)$ less than the degree of $b(x)$, using inspection, 	<ul style="list-style-type: none"> • Use long division to find factors. 		<ul style="list-style-type: none"> • quiz

			long division.			
	Polynomial Identities	<ul style="list-style-type: none"> • How do algebraic representations relate and compare to one another? • How can we communicate and generalize algebraic relationships? 	<ul style="list-style-type: none"> • Prove polynomial identities and use them to describe numerical relationships. For example, the polynomial identity $(x^2 + y^2)^2 = (x^2 - y^2)^2 + (2xy)^2$ can be used to generate Pythagorean triples. 	<ul style="list-style-type: none"> • Prove polynomial Identities and describe relationships 	October	<ul style="list-style-type: none"> • quiz/unit test
UNIT 2 - RADICAL EXPONENTS AND COMPLEX NUMBERS	Properties of real numbers	<ul style="list-style-type: none"> • How can properties of real numbers help us to evaluate numerical expressions? • What is the order of operations? • What is a real number, a rational number, and an irrational number? 	<ul style="list-style-type: none"> • Real Numbers have properties • Real Numbers are Commutative, Associative and Distributive: • Real Numbers are closed (the result is also a real number) under addition and multiplication: • For addition the inverse of a real number is its negative, and for multiplication the inverse is its reciprocal. 	<ul style="list-style-type: none"> • Utilize properties and order of operations to evaluate expressions. Be able to distinguish between rational and irrational numbers. 	October	<ul style="list-style-type: none"> • Daily homework
	Powers	<ul style="list-style-type: none"> • What do zero and negative exponents mean? 	<ul style="list-style-type: none"> • Extend the properties of exponents to include rational exponents, and zero. 	<ul style="list-style-type: none"> • Utilize properties to simplify exponential expressions 		<ul style="list-style-type: none"> • Daily homework
	Exponent Laws	<ul style="list-style-type: none"> • What are the laws of exponents? 	<ul style="list-style-type: none"> • Properly use laws of exponents 	<ul style="list-style-type: none"> • Use properties to combine exponential expressions 		<ul style="list-style-type: none"> • Daily homework

	Rational Exponents	<ul style="list-style-type: none"> • What does a fractional exponent mean? • How to solve with variable bases & fractional exponents? 	<ul style="list-style-type: none"> • Extend the properties of exponents to rational exponents. 	<ul style="list-style-type: none"> • Utilize rational exponents in simplifying exponential expressions. 		<ul style="list-style-type: none"> • quiz
	Operations with radicals	<ul style="list-style-type: none"> • How do we add, subtract, multiply, divide with radicals? 	<ul style="list-style-type: none"> • Simplify radical expressions with numbers and variables of different indices to combine like terms. 	<ul style="list-style-type: none"> • combine radicals to simplest form 		<ul style="list-style-type: none"> • quiz
	Simplify imaginary units	<ul style="list-style-type: none"> • How do you simplify powers of i? • What makes a number a complex number? • How do we graph a complex number? 	<ul style="list-style-type: none"> • Know there is a complex number i such that $i^2 = -1$, and every complex number has the form $a + bi$ with a and b real. • 	<ul style="list-style-type: none"> • simplify imaginary units 		<ul style="list-style-type: none"> • Daily homework
	Operations with complex numbers	<ul style="list-style-type: none"> • Can you perform all operations with complex numbers? • How do you simplify a rational number whose denominator is a complex number? • Can you graph the sum/difference? 	<ul style="list-style-type: none"> • Use the relation $i^2 = -1$ and the commutative, associative, and distributive properties to add, subtract, and multiply complex numbers. • Graph the sum/difference of 2 complex numbers using vectors 	<ul style="list-style-type: none"> • Operations with complex numbers, rationalizing a complex number. 		<ul style="list-style-type: none"> • quiz/unit test
UNIT 3 - SOLVING EQUATIONS	Solving linear equations and inequalities	<ul style="list-style-type: none"> • How do we solve linear equations? • How do we solve and graph a linear inequality and compound inequalities? 	<ul style="list-style-type: none"> • Explain each step in solving a simple equation as following from the equality of numbers asserted at the previous step.. Construct a viable argument to justify a solution method. 	<ul style="list-style-type: none"> • Create equations and inequalities in one variable and use them to solve problems. 		<ul style="list-style-type: none"> • quiz

	Solving absolute value equations/inequalities	<ul style="list-style-type: none"> How do we solve an absolute value equation and inequality algebraically and graphically? 	<ul style="list-style-type: none"> Solve algebraically and graphically an absolute value equation and inequality involving linear expressions in one variable 	<ul style="list-style-type: none"> Solving and checking solutions for extraneous roots 		<ul style="list-style-type: none"> quiz
	Solving linear systems	<ul style="list-style-type: none"> Can you solve a systems of equations with two unknowns? 	<ul style="list-style-type: none"> Prove that, given a system of two equations in two variables, replacing one equation by the sum of that equation and a multiple of the other produces a system with the same solutions. 	<ul style="list-style-type: none"> Solve linear equations and inequalities in one variable, including equations with coefficients represented by letters. 		<ul style="list-style-type: none"> Daily homework
	Solving 3-variable systems	<ul style="list-style-type: none"> Can you solve a systems of equations with three unknowns? 	<ul style="list-style-type: none"> Analyze and solve linear equations and pairs of simultaneous linear equations. 	<ul style="list-style-type: none"> Solve for a 3 equation 3 variable system 	November	<ul style="list-style-type: none"> quiz
	Solving quadratics	<ul style="list-style-type: none"> How do we solve quadratic equations? What different ways can be used to solve quadratic equations? 	<ul style="list-style-type: none"> Using factoring, quadratic formula, completing the square. 	<ul style="list-style-type: none"> Properly use each method to solve quadratic equation 	November	<ul style="list-style-type: none"> Daily homework
	Nature of the roots	<ul style="list-style-type: none"> Can you describe the roots and graphs of quadratic equations using the discriminant? 	<ul style="list-style-type: none"> The discriminant is the name given to the expression that appears under the square root (radical) sign in the quadratic formula. 	<ul style="list-style-type: none"> The discriminant tells you about the "nature" of the roots of a quadratic equation given that a, b and c are rational numbers 		<ul style="list-style-type: none"> Daily homework

	Standard Form of circle	<ul style="list-style-type: none"> • How do we use completing the square to write circles in center-radius form? • How do we write the standard form of a circle given center-radius form? 	<ul style="list-style-type: none"> • Write the equation of a circle in center radius form using completing the square • Use $(x - h)^2 + (y - k)^2 = r^2$ form of a circle. • Determine the center and radius of a circle in standard form. 	<ul style="list-style-type: none"> • discern between center-radius form and standard form 		<ul style="list-style-type: none"> • quiz
	Solving linear quadratic or circle systems	<ul style="list-style-type: none"> • Can you solve a system of linear/quadratic or circle equations algebraically and graphically? 	<ul style="list-style-type: none"> • Solve a simple system consisting of a linear equation and a quadratic equation in two variables algebraically and graphically. For example, find the points of intersection between the line $y = -3x$ and the circle $x^2 + y^2 = 3$. 	<ul style="list-style-type: none"> • Include systems consisting of one linear and one quadratic equation. Include systems that lead to work with fractions. For example, finding the intersections between $x^2 + y^2 = 1$ and $y = (x+1)/2$ leads to the point $(3/5, 4/5)$ on the unit circle, corresponding to the Pythagorean triple 		<ul style="list-style-type: none"> • Daily homework
	Solving quadratic inequalities	<ul style="list-style-type: none"> • How do we solve quadratic inequalities algebraically and graphically? 	<ul style="list-style-type: none"> • Solve quadratic inequalities (in one variable) algebraically and graphically on a number line. • Solve quadratic inequalities on the graphing calculator. 	<ul style="list-style-type: none"> • Use factoring and the number line to find the solution set for quadratic inequalities. 		<ul style="list-style-type: none"> • Daily homework

	Solving rational equations	<ul style="list-style-type: none"> • What makes an equation a rational equation? • How do we solve a fractional equation using the LCD? 	<ul style="list-style-type: none"> • Solve fractional equations using LCD method and check for extraneous roots. 	<ul style="list-style-type: none"> • Solve work application problems with fractional equations. 		<ul style="list-style-type: none"> • Daily homework
	Solving with undefined roots	<ul style="list-style-type: none"> • What is an extraneous root? 	<ul style="list-style-type: none"> • Understand solving equations as a process of reasoning and explain the reasoning. 	<ul style="list-style-type: none"> • Able to note when an extraneous root is found 	December	<ul style="list-style-type: none"> • Daily homework, quiz
	Solving radical equations	<ul style="list-style-type: none"> • How do you solve an equation with a radical? • What is an extraneous root? 	<ul style="list-style-type: none"> • Solve equations containing radicals 	<ul style="list-style-type: none"> • Solve and check for extraneous roots 		<ul style="list-style-type: none"> • Daily homework
	Solving with rational exponents	<ul style="list-style-type: none"> • What does a fractional exponent mean? • How to solve with variable bases & fractional exponents? 	<ul style="list-style-type: none"> • Rewrite algebraic expressions with fractional exponents as radical expressions and vice versa. • Solve equations with variable bases with fractional exponents. 	<ul style="list-style-type: none"> • Evaluate an expression and solve equations with fractional exponent. 		<ul style="list-style-type: none"> • quiz/unit test
UNIT 4 - FUNCTIONS AND THEIR GRAPHS	Domain, range, function	<ul style="list-style-type: none"> • What is domain? • What is range? • What is the difference between a relation and function? 	<ul style="list-style-type: none"> • Understand that a function from one set (called the domain) to another set (called the range) assigns to each element of the domain exactly one element of the range. If f is a function and x is an element of its domain, then $f(x)$ denotes the output of f corresponding to the input x. The graph of f is the graph of the equation $y = f(x)$. 	<ul style="list-style-type: none"> • Use function notation, evaluate functions for inputs in their domains, and interpret statements that use function notation in terms of a context. 		<ul style="list-style-type: none"> • Daily homework, class assignment

Unit 4 - Functions and their graphs	Domain, range, function notation	<ul style="list-style-type: none"> • What is domain? • What is range? • What is the difference between a relation and function? 	<ul style="list-style-type: none"> • Understand that a function from one set (called the domain) to another set (called the range) assigns to each element of the domain exactly one element of the range. If f is a function and x is an element of its domain, then $f(x)$ denotes the output of f corresponding to the input x. The graph of f is the graph of the equation $y = f(x)$. 	<ul style="list-style-type: none"> • Use function notation, evaluate functions for inputs in their domains, and interpret statements that use function notation in terms of a context. 		<ul style="list-style-type: none"> • Daily homework, class assignment
	Add, subtract multiply functions	<ul style="list-style-type: none"> • How do we perform basic operations with 2 functions? 	<ul style="list-style-type: none"> • Build a function that models a relationship between two quantities. • Combine standard function types using arithmetic operations. 	<ul style="list-style-type: none"> • Interpret expressions for functions in terms of the situation they model. 		<ul style="list-style-type: none"> • Daily homework, quizzes
	Create composite equations	<ul style="list-style-type: none"> • What does $f(g(x))$ mean? 	<ul style="list-style-type: none"> • Build new functions from existing functions. Find the composition of $f(g(x))$. • Determine the inverse of a function and use composition to justify the result. • 	<ul style="list-style-type: none"> • Interpret functions that arise in applications in terms of a context. 		<ul style="list-style-type: none"> • Daily homework, group work
	Graphing functions	<ul style="list-style-type: none"> • How can you tell if a graph is a function? 	<ul style="list-style-type: none"> • Determine if the graph of a relation is a function 	<ul style="list-style-type: none"> • Use the VLT. 		<ul style="list-style-type: none"> • Daily homework, group work
	Review graph features	<ul style="list-style-type: none"> • How do you sketch the graph of a polynomial using relative mins, maxs, axis of symmetry, and roots? 	<ul style="list-style-type: none"> • For a function that models a relationship between two quantities, interpret key features of graphs and tables in terms of the quantities, and sketch graphs showing key features given a verbal description of the relationship. 	<ul style="list-style-type: none"> • intercepts; intervals where the function is inc, dec, pos, or neg relative maximums and minimums, symmetries and end behavior 		<ul style="list-style-type: none"> • Daily homework, quizzes

	End behavior	<ul style="list-style-type: none"> How do you identify even and odd functions? Can you describe the end behavior of a function based on the graph? 	<ul style="list-style-type: none"> Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases. 	<ul style="list-style-type: none"> Graph linear and quadratic functions and show intercepts, maxima, minima, end behavior. 		<ul style="list-style-type: none"> Daily homework, class assignment
	Transformations of graphs	<ul style="list-style-type: none"> How do transformations affect the equations of relations? 	<ul style="list-style-type: none"> Identify the effect on the graph of replacing $f(x)$ by $f(x) + k$, $k f(x)$, $f(kx)$, and $f(x + k)$ for specific values of k (both positive and negative); find the value of k given the graphs. 	<ul style="list-style-type: none"> Experiment with cases and illustrate an explanation of the effects on the graph using technology. 		<ul style="list-style-type: none"> Daily homework, quizzes, class assignment
	Review parabola equations and graphs	<ul style="list-style-type: none"> What are the different ways to graph a parabola? 	<ul style="list-style-type: none"> Review graphing parabolas, describing key features. Use $y = ax^2 + bx + c$, $y = (x - p)^2 + q$, and $(x - h)^2 = 4p(y - k)$ forms. 	<ul style="list-style-type: none"> Graph using each form. 	January	<ul style="list-style-type: none"> Daily homework, class assignment
	Focus-directrix of parabolas	<ul style="list-style-type: none"> What does the focus and directrix of a parabola mean in relationship to the graph and the equation? 	<ul style="list-style-type: none"> Define focus and directrix, and derive the equation of a parabola given its focus and directrix. 	<ul style="list-style-type: none"> Find equations of parabolas, given various relationships. 		<ul style="list-style-type: none"> Daily homework, group work
	Average rate of change	<ul style="list-style-type: none"> How does average rate of change apply to all types of functions? 	<ul style="list-style-type: none"> determine the average rate of change of a function represented numerically, algebraically, and graphically. 	<ul style="list-style-type: none"> Calculate and interpret the average rate of change of a function Estimate the rate of change from a graph. 		<ul style="list-style-type: none"> Daily homework, quiz
	Solving systems graphically	<ul style="list-style-type: none"> Can you solve a system graphically? 	<ul style="list-style-type: none"> Explain why the x-coordinates of the points where the graphs of the equations $y = f(x)$ and $y = g(x)$ intersect are the solutions; find the solutions 	<ul style="list-style-type: none"> Understand that the graph of an equation in two variables is the set of all its 		<ul style="list-style-type: none"> Daily homework, quiz

			approximately, e.g., using technology to graph the functions, make tables of values, or find successive approximations.	solutions plotted in the coordinate plane.		
	Comparing properties of polynomial functions	<ul style="list-style-type: none"> • What is a 1-1, even or odd function? 	<ul style="list-style-type: none"> • Graphs of Even Functions Given a function $f(x)$, if $f(c) = f(-c)$ for all c in the domain, then $f(x)$ is an <i>even</i> function and its graph will have symmetry with respect to the y-axis. • Graphs of Odd Functions Given a function $f(x)$, if $f(c) = -f(-c)$ for all c in the domain, then $f(x)$ is called an <i>odd</i> function and its graph will have symmetry with respect to the origin. Symmetry with respect to the origin implies that a 180 degree rotation of the graph about $(0,0)$ results in an identical graph. • 	<ul style="list-style-type: none"> • Recognize the properties of functions. 		<ul style="list-style-type: none"> • Daily homework, group work
	Graphing rational functions	<ul style="list-style-type: none"> • What is a rational function and how do you graph it? • How do you determine asymptotes and holes in graphs of rational functions? 	<ul style="list-style-type: none"> • Find the domain of a rational function • Recognize a rational function's graph as a transformation of the inverses. 	<ul style="list-style-type: none"> • Identify the domain of a rational function 		<ul style="list-style-type: none"> • Daily homework, quizzes
	Inverse functions	<ul style="list-style-type: none"> • How do you find the inverse of a function? • What is the notation for inverse of a function? 	<ul style="list-style-type: none"> • Determine if a function is invertible • Find the inverse of a function • Explain and use the inverse composition rule of invertible functions 	<ul style="list-style-type: none"> • Use HLT to find if a function has inverse • Use algebra to find and confirm a function's inverse • 		<ul style="list-style-type: none"> • Daily homework, class assignment
MIDTERM	Review		•	•	January	•

Unit 5 - Polynomial functions	Define polynomials	<ul style="list-style-type: none"> • What is a polynomial in standard form? 	<ul style="list-style-type: none"> • an expression consisting of the sum of two or more terms each of which is the product of a constant and a variable raised to an integral power: $ax^2 + bx + c$ is a polynomial, where $a, b,$ and c are constants and x is a variable 	<ul style="list-style-type: none"> • Able to determine standard form of polynomial. 		<ul style="list-style-type: none"> • Daily homework
	Solve polynomial equations by factoring	<ul style="list-style-type: none"> • How can you solve polynomials? 	<ul style="list-style-type: none"> • Determine whether real zeroes exist • Approximate irrational zeroes 	<ul style="list-style-type: none"> • Determine real roots. 		<ul style="list-style-type: none"> • Daily homework
	Graphing polynomial functions	<ul style="list-style-type: none"> • How do you graph a polynomial? 	<ul style="list-style-type: none"> • Graph a cubic and quartic function to find real zeroes, intercepts, local extrema and end behavior • 	<ul style="list-style-type: none"> • Use TI84+ to graph a degree 3 or higher polynomial and describe its behavior 		<ul style="list-style-type: none"> • Daily homework
	Features of polynomial graphs	<ul style="list-style-type: none"> • What does a polynomial look like when graphed? 	<ul style="list-style-type: none"> • Sketching graphs from zeros • Describe the continuity of a function from its graph • Determine if a function is constant, increasing or decreasing from its graph • Determine the local max and min and end behavior of a function 	<ul style="list-style-type: none"> • Tell if a function is continuous or discontinuous; increasing, constant or decreasing; and odd, even or neither 		<ul style="list-style-type: none"> • Daily homework
	Zeros of polynomial functions	<ul style="list-style-type: none"> • How do you find zeros of functions? 	<ul style="list-style-type: none"> • Find zeros by factoring, graphing, using table, Approximate irrational zeroes. 	<ul style="list-style-type: none"> • Determine real zeroes of a function from its equation and graph 		<ul style="list-style-type: none"> • Daily homework
	Odd and even functions	<ul style="list-style-type: none"> • How do you find if a function is odd or even? 	<ul style="list-style-type: none"> • From equations and graphs. 	<ul style="list-style-type: none"> • Determine if odd/even 		<ul style="list-style-type: none"> • Daily homework

	Transformation of polynomial functions	<ul style="list-style-type: none"> • How is a function related to the parent function? 	<ul style="list-style-type: none"> • Determine how reflections change in a function's equation • Determine the stretch or shrink from a function's equation 	<ul style="list-style-type: none"> • Identify the translation from a function's basic equation • 		<ul style="list-style-type: none"> • Daily homework
	Finding equations of polynomial functions	<ul style="list-style-type: none"> • How do you find equations of the functions? 	<ul style="list-style-type: none"> • Finding equations using zeros of the function. 	<ul style="list-style-type: none"> • Find equations using graphs, tables, and zeros. 		<ul style="list-style-type: none"> • Daily homework
	Intersections of polynomial and other graphs	<ul style="list-style-type: none"> • How can you use intersection of graphs to solve a problem? 	<ul style="list-style-type: none"> • Use the intersections of systems of equations to solve a problem graphically 	<ul style="list-style-type: none"> • Use a graph to solve an equation or system of equations • Use a graphing calculator to approximate solutions 		<ul style="list-style-type: none"> • Daily homework
	Remainder theorem	<ul style="list-style-type: none"> • How can you find remainders without dividing? 	<ul style="list-style-type: none"> • Use remainder theorem to evaluate a function and find a remainder without dividing 	<ul style="list-style-type: none"> • Use division and remainder theorem to find factors and remainders 		<ul style="list-style-type: none"> • Daily homework
Unit 6 - Sequences and Series	Review arithmetic sequences	<ul style="list-style-type: none"> • What is an arithmetic sequence? • What is the difference between the terms series and sequence? 	<ul style="list-style-type: none"> • recognizing sequences as functions • Find the " Kth" term of an arithmetic sequence • Write a formula for an arithmetic sequence • Use and evaluate the Σ notation with sequence sums • Find the sum of " n" terms of an arithmetic sequence 	<ul style="list-style-type: none"> • Find a specific term and the sum of a finite arithmetic sequence 		<ul style="list-style-type: none"> • Daily homework

	Review geometric sequences	<ul style="list-style-type: none"> • Can you recognize a geometric sequence? • What function that we studied this year is a model of a geometric sequence? 	<ul style="list-style-type: none"> • Find the “kth” term of a geometric sequence • Write a formula for a geometric sequence • Find the sum on “n” terms of a geometric sequence and an infinite geometric sequence 	<ul style="list-style-type: none"> • Find a specific term and the sum of an infinite and finite geometric sequence 		<ul style="list-style-type: none"> • Daily homework
	Define sequences recursively and explicitly	<ul style="list-style-type: none"> • Can you recognize the recursive or explicit sequence? 	<ul style="list-style-type: none"> • Recognize and extend the Fibonacci number sequence • Find a number pattern in a sequence and use it to extend it 	<ul style="list-style-type: none"> • Define and extend a sequence recursively 		<ul style="list-style-type: none"> • Daily homework
	Translate between recursive and explicit	<ul style="list-style-type: none"> • Can you discern between recursive and explicit? 	<ul style="list-style-type: none"> • translate between recursive and explicit formulas 	<ul style="list-style-type: none"> • know difference between recursive and explicit functions. 		<ul style="list-style-type: none"> • Daily homework
	Constructing sequences	<ul style="list-style-type: none"> • Can you find the equation of the sequence? 	<ul style="list-style-type: none"> • writing arithmetic and geometric sequences both recursively and explicitly 	<ul style="list-style-type: none"> • Construct the sequence 	February	<ul style="list-style-type: none"> • Daily homework
	Explicit/recursive sequence from context	<ul style="list-style-type: none"> • Can you determine the formula? 	<ul style="list-style-type: none"> • determine explicit or recursive from a context 	<ul style="list-style-type: none"> • Utilizing the proper function. 		<ul style="list-style-type: none"> • Daily homework
	Real life models of sequences	<ul style="list-style-type: none"> • Can you find and use the equation? 	<ul style="list-style-type: none"> • construct equations related to linear functions and graphs • 	<ul style="list-style-type: none"> • Use formulas to model situations. 		<ul style="list-style-type: none"> • Daily homework
	Arithmetic and geometric series	<ul style="list-style-type: none"> • Can you find the sum of “n” terms of an arithmetic sequence? 	<ul style="list-style-type: none"> • Find the sum of “n” terms of an arithmetic sequence 	<ul style="list-style-type: none"> • Find a specific term of a finite arithmetic and geometric 		<ul style="list-style-type: none"> • Daily homework

				sequence		
	Summation	<ul style="list-style-type: none"> • Can you find the sum of a sequence? 	<ul style="list-style-type: none"> • Use and evaluate the Σ notation with sequence sums 	<ul style="list-style-type: none"> • Find the sum of a finite arithmetic and geometric sequence 		<ul style="list-style-type: none"> • Daily homework, Unit Test
Unit 7- Exponentials and Logarithms	Exponential graphs	<ul style="list-style-type: none"> • Can you graph exponential functions? 	<ul style="list-style-type: none"> • What does the graph of an exponential function look like? • Graph exponential functions - intercepts, end behavior 	<ul style="list-style-type: none"> • Graph exponential functions involving the base "e", 2, 10? 	March	<ul style="list-style-type: none"> • Daily homework
	Transformations of exponential functions	<ul style="list-style-type: none"> • Can you graph exponential functions from the parent functions? 	<ul style="list-style-type: none"> • Identify the effect on the graph of replacing $f(x)$ by $f(x) + k$, $k f(x)$, $f(kx)$, and $f(x + k)$ for specific values of k (both positive and negative); find the value of k given the graphs. 	<ul style="list-style-type: none"> • Experiment with cases and illustrate an explanation of the effects on the graph using technology. 		<ul style="list-style-type: none"> • Daily homework
	Exponential functions modeling real life situations	<ul style="list-style-type: none"> • Can you find the equation? 	<ul style="list-style-type: none"> • Identify situations where "e", 2 or 10 should be used in a problem • • Graph exponential functions of the form $y = a(b)^x$ 	<ul style="list-style-type: none"> • Use formulas to model situations. 		<ul style="list-style-type: none"> • Daily homework
	Average rate of change	<ul style="list-style-type: none"> • How does average rate of change apply to all types of functions? 	<ul style="list-style-type: none"> • determine the average rate of change of a function represented numerically, algebraically, and graphically 	<ul style="list-style-type: none"> • Calculate and interpret the average rate of change of a function Estimate the rate of change from a graph. 		<ul style="list-style-type: none"> • Daily homework

	Using properties of exponents with exponential functions	<ul style="list-style-type: none"> Do you know all the properties of exponents? 	<ul style="list-style-type: none"> review and expand on rules of exponents in exponential functions. Prepare for the rules of logarithms. 	<ul style="list-style-type: none"> Use correct rules of exponents. 		<ul style="list-style-type: none"> Daily homework
	Define and evaluate logs	<ul style="list-style-type: none"> What is a logarithm and can you evaluate it? 	<ul style="list-style-type: none"> Knowing rules of logs to evaluate. 	<ul style="list-style-type: none"> Evaluate logarithms using technology 		<ul style="list-style-type: none"> Daily homework, group work
	Exp and logs as inverse functions	<ul style="list-style-type: none"> How are exponents and logs related? 	<ul style="list-style-type: none"> Convert between the exponential and logarithmic function equation Explain the inverse relationship between exponential and logarithmic functions 	<ul style="list-style-type: none"> Find inverses of logs and exponents and see relationship. 		<ul style="list-style-type: none"> Daily homework, quizzes
	Solve exponential functions	<ul style="list-style-type: none"> Can you solve an exponential equation by graphing, using a table or algebraically? 	<ul style="list-style-type: none"> Solving exponential equations using logarithms to solve, using base 2, 10 and e. 	<ul style="list-style-type: none"> Use proper base to solve equations. 		<ul style="list-style-type: none"> Daily homework, in class work
	Graphing logarithmic functions	<ul style="list-style-type: none"> Can you graph log that is not a base 10? 	<ul style="list-style-type: none"> Graph logarithmic functions - intercepts, end behavior. 	<ul style="list-style-type: none"> graphically represent logs. 		<ul style="list-style-type: none"> Daily homework, group work
	Solve growth and decay	<ul style="list-style-type: none"> What is continuous growth or decay? 	<ul style="list-style-type: none"> Use "e", 2, 10 as a base in an exponential function. 	<ul style="list-style-type: none"> Determine growth or decay functions. 		<ul style="list-style-type: none"> Daily homework, Unit Test
Unit 8 - Trigonometry	Right triangle trigonometry	<ul style="list-style-type: none"> Do you know the basic trig functions? 	<ul style="list-style-type: none"> Define the basic trig functions 	<ul style="list-style-type: none"> Know the basic trig functions. 		<ul style="list-style-type: none"> Daily homework, group work

	Co-functions	<ul style="list-style-type: none"> • Can you solve for a variable in an equation with co-functions? 	<ul style="list-style-type: none"> • Know and apply the co-function relationship between trig ratios. 	<ul style="list-style-type: none"> • Use complements of co-functions 		<ul style="list-style-type: none"> • Daily homework, quizzes
	Solving right triangle problems	<ul style="list-style-type: none"> • Can you apply the trig functions to “solve a right triangle”? 	<ul style="list-style-type: none"> • Apply basic trig functions to solve right triangle problems • Use Pythagoras in right triangle problems 	<ul style="list-style-type: none"> • Solve a right triangles sides and angles. 		<ul style="list-style-type: none"> • Daily homework, in class assignments
	Exact values	<ul style="list-style-type: none"> • Do you know all the trig functions for the special triangles and quadrantals? 	<ul style="list-style-type: none"> • Exact values for all trig functions quadrantals, and 30°, 45°, 60° 	<ul style="list-style-type: none"> • Use the special triangle values. 		<ul style="list-style-type: none"> • Daily homework, quizzes
	Reciprocal functions	<ul style="list-style-type: none"> • What does Arc sin mean? • Can you state the domain and range for each trig function? 	<ul style="list-style-type: none"> • Sketch & identify the graphs of reciprocal trig functions – secant, cosecant, cotangent • State domain and range for all trig functions. • 	<ul style="list-style-type: none"> • Find sec, csc & cot of an angle • Find Arc sin, Arc cos, Arc tan • Graph reciprocal and inverse trig functions. • 		<ul style="list-style-type: none"> • Daily homework, group work
	Radians and arc length	<ul style="list-style-type: none"> • How do you use a radian to measure an angle? 	<ul style="list-style-type: none"> • Express locations on the unit circle as angle rotations in terms of degrees and radians. 	<ul style="list-style-type: none"> • interpreted as radian measure of angles going counterclockwise 	April	<ul style="list-style-type: none"> • Daily homework
	Conversions between degrees and radians	<ul style="list-style-type: none"> • How do you convert from degree to radian and radian to degree? 	<ul style="list-style-type: none"> • Change between degrees and radians • Given a radius and central angle find the length of an arc using $S = r\theta$ 	<ul style="list-style-type: none"> • Convert between degree and radian measure • • Use $S = \theta r$ 		<ul style="list-style-type: none"> • Daily homework, group work

	Unit circle	<ul style="list-style-type: none"> How are the coordinates of a point on the unit circle related to the sine and cosine of the rotation on the circle? 	<ul style="list-style-type: none"> Find the sine and cosine values of (x,y) coordinates State the sin and cos of quadrantal angles by their (x,y) coordinates State the sin, cos and tan values of the 16 points on the unit circle Write a trig function in terms of a positive acute angle. 	<ul style="list-style-type: none"> Explain unit circle enables extension of trig functions to real #'s 		<ul style="list-style-type: none"> Daily homework, in class assignment
	Reference angles	<ul style="list-style-type: none"> Can you find a reference angle for a given angle? 	<ul style="list-style-type: none"> Sketch and use the reference angle for angles in standard position. 	<ul style="list-style-type: none"> Use TI-84+ to find sine, cosine, tangent of any angle 		<ul style="list-style-type: none"> Daily homework, group assignment
	Pythagorean identities	<ul style="list-style-type: none"> What is an identity? How can you apply the quotient, reciprocal and Pythagorean identities in trig? 	<ul style="list-style-type: none"> Use the quotient, reciprocal, cofunction and Pythagorean trig identities to simplify trig expressions Confirm if a trig equation is a trig function. 	<ul style="list-style-type: none"> Simplify trig expressions using identities Trig identity proofs 		<ul style="list-style-type: none"> Daily homework, quizzes
	Graphing trig functions	<ul style="list-style-type: none"> What does a trig graph look like? 	<ul style="list-style-type: none"> Graph $y = \sin x$ and $y = \cos x$ Tell the domain and range of the sin or cos function 	<ul style="list-style-type: none"> Use TI84+ to graph trig functions 		<ul style="list-style-type: none"> Daily homework, in class assignment
	Transformations of trig functions	<ul style="list-style-type: none"> Can you graph trigonometric functions - amplitude, period (frequency) & midline? 	<ul style="list-style-type: none"> Choose trig functions to model periodic phenomena - amp, freq, midline. 	<ul style="list-style-type: none"> Find, graph and interpret sinusoidal trig equations 		<ul style="list-style-type: none"> Daily homework, quizzes
	Modeling real life situations with trig functions	<ul style="list-style-type: none"> Do you know when to use radians vs degree mode when graphing trig equations? 	<ul style="list-style-type: none"> Determine when to use radian vs degree mode in model problems. 	<ul style="list-style-type: none"> Use TI84+ to graph trig functions 		<ul style="list-style-type: none"> Daily homework, group work

	Graphing reciprocal functions	<ul style="list-style-type: none"> • Can you name the reciprocal trig functions'? 	<ul style="list-style-type: none"> • Sketch & identify the graphs of reciprocal trig functions – secant, cosecant, cotangent 	<ul style="list-style-type: none"> • Graph reciprocal and trig functions. 		<ul style="list-style-type: none"> • Daily homework, Unit Test
Unit 9 - Statistics	Measures of center and dispersion	<ul style="list-style-type: none"> • What are the measures of center and dispersion? • How do we find the appropriate measures for given data? 	<ul style="list-style-type: none"> • Be able to calculate mean, median, IQR, mean average deviation and standard deviation by hand and with calculator 	<ul style="list-style-type: none"> • Calculate statistics using graphing calculator 	May	<ul style="list-style-type: none"> • Daily homework, quizzes
	Normal distribution from data	<ul style="list-style-type: none"> • How do we create a normal distribution curve for given data? • How do we determine if our data is normal? 	<ul style="list-style-type: none"> • Using mean and standard deviation from data, draw and scale an appropriate normal(bell) curve • Decide whether the curve is normal or skewed and explain why 	<ul style="list-style-type: none"> • Draw normal curve with statistics from given data 		<ul style="list-style-type: none"> • Daily homework, in class assignments
	Estimating area under curve	<ul style="list-style-type: none"> • How do we estimate the area under a normal curve? • What does this area correspond to? 	<ul style="list-style-type: none"> • Using tables and calculator, find the area of a given portion under a normal curve • Explain the connection between area under a normal curve and probability 	<ul style="list-style-type: none"> • Use a graphing calculator to find areas 		<ul style="list-style-type: none"> • Daily homework, quizzes
	Estimating Percentages from data	<ul style="list-style-type: none"> • What are the approximate percentages of the first 3 standard deviations? • How do we estimate percentages for population? 	<ul style="list-style-type: none"> • Recognize the values of the first 3 standard deviations for a data set and know the corresponding percentages • Be able to convert the area under a normal curve to a percentage 	<ul style="list-style-type: none"> • Give percentages for 1st 3 standard deviations • Calculate probabilities from area found 		<ul style="list-style-type: none"> • Daily homework, quizzes
	Modeling real life problems	<ul style="list-style-type: none"> • How can we use normal distribution to estimate population percentages and quantities from real 	<ul style="list-style-type: none"> • Be able to calculate percentages given data and explain its meaning contextually • Be able to find the corresponding quantities for percentages for given data 	<ul style="list-style-type: none"> • Use calculator to find probabilities • Explain what numbers mean in context 		<ul style="list-style-type: none"> • Daily homework, in class projects

		data?				
	Regression and correlation review	<ul style="list-style-type: none"> • How interpret scatter plots? • What is the difference between correlation and causation? • How do we find the linear correlation coefficient and what does it tell us? 	<ul style="list-style-type: none"> • Be able to draw and interpret scatter plots • Describe the correlation from the scatter plot • Find the linear correlation coefficient using a calculator • Use residuals to help determine good fit 	<ul style="list-style-type: none"> • Use graphing calculator STAT CALC to find r and display scatter plots 		<ul style="list-style-type: none"> • Daily homework, quizzes
	Regression equations	<ul style="list-style-type: none"> • How do we find and use the regression equation for predictions? • How do we decide which equation is best fitting for our given data? 	<ul style="list-style-type: none"> • Find linear, quadratic, exponential and trigonometric regression equations using the calculator • Use the linear regression equation to predict data values for the population 	<ul style="list-style-type: none"> • Use calculator to find regression equations • Use calculator to find r^2 		<ul style="list-style-type: none"> • Daily homework, in class group work
	Understanding inferences about populations	<ul style="list-style-type: none"> • How do we use statistical data to make inferences about a population? • Do our results match what we expected from the population? 	<ul style="list-style-type: none"> • Understand that statistical data are used to make inferences about population parameters from a random sample of that population. • Determine if a particular set of data is consistent with what was expected, whether obtained through simulation or experimentation. 	<ul style="list-style-type: none"> • Explain what statistics mean in terms of context 		<ul style="list-style-type: none"> • Daily homework and quizzes
	Experiments, observations and simulations	<ul style="list-style-type: none"> • What is the difference between data collected from surveys, experiments and 	<ul style="list-style-type: none"> • Understand the purposes and differences among sample surveys, experiments, and observations. • Explain the necessity of 	<ul style="list-style-type: none"> • Decide if bias is present • Determine how to avoid bias 		<ul style="list-style-type: none"> • Daily homework

		<p>observations</p> <ul style="list-style-type: none"> How do we avoid bias in data collection? 	<p>randomization to prevent biased results.</p>			
	Margin of error	<ul style="list-style-type: none"> How do we calculate the margin of error? What does the margin of error mean in terms of the context of the data? 	<ul style="list-style-type: none"> Estimate a population mean by using data from random samples, and develop a margin of error. Explain the margin of error for given data 	<ul style="list-style-type: none"> Calculate margin of error by given formula 		<ul style="list-style-type: none"> Daily homework, quizzes
	Confidence levels and significance	<ul style="list-style-type: none"> What does it mean to be 95% confident? 99%? How do we determine if there are significant differences between samples? How do we interpret statistical reports? 	<ul style="list-style-type: none"> Discuss 95% and 99% confidence levels. Analyze the results of a randomized experiment using two samples, and determine if the differences in their parameters are significant. Examine reports that are based on data and interpret the reports in context of the situation. 	<ul style="list-style-type: none"> Explain percentage error with given confidence level 		<ul style="list-style-type: none"> Daily homework, group work, Unit Test
Unit 10 - Probability	Review of probability	<ul style="list-style-type: none"> How do we determine probabilities? How do we determine the number of outcomes of an event? 	<ul style="list-style-type: none"> Explain what the probability of an event is, including probabilities of 0 and 1 Create sample spaces for events 	<ul style="list-style-type: none"> Find basic probabilities List sample spaces 	June	<ul style="list-style-type: none"> Homework, quizzes
	Definitions	<ul style="list-style-type: none"> What is a subset? How do we find unions, intersections and complements of subsets? 	<ul style="list-style-type: none"> Determine subsets of given sets Find unions, intersections and complements of sets and subsets Use and, or and not in explanations for unions, intersections and complements 	<ul style="list-style-type: none"> Create subsets Combine/determine subsets using specific vocabulary 		<ul style="list-style-type: none"> Homework, in class assignments

	Venn diagrams	<ul style="list-style-type: none"> • How is a Venn diagram used? • How do we determine probability from Venn diagrams? 	<ul style="list-style-type: none"> • Create and discuss data in a Venn diagram 	<ul style="list-style-type: none"> • Interpret Venn diagrams numerically 		<ul style="list-style-type: none"> • Homework, quizzes
	Independence and conditional probability	<ul style="list-style-type: none"> • How do we know if events are independent? • How will a probability change if events are dependent? 	<ul style="list-style-type: none"> • Show two events are independent by using the product of their probabilities • Use sample spaces and Venn Diagrams to demonstrate conditional probability. • Understand the conditional probability of A given B as $P(A/B) = P(A \text{ and } B)/P(B)$. 	<ul style="list-style-type: none"> • Calculate probabilities of multiple events • Calculate conditional probabilities 		<ul style="list-style-type: none"> • Homework, in class projects
	Two-way tables	<ul style="list-style-type: none"> • How do we set up 2-way frequency table? • How are 2-way table used to find probabilities and conditional probabilities? 	<ul style="list-style-type: none"> • Find probabilities from a 2-way table • Determine conditional probabilities using 2-way tables • Construct 2-way tables from given data 	<ul style="list-style-type: none"> • Interpret 2-way tables to find probabilities 		<ul style="list-style-type: none"> • Homework, quizzes
	Applying conditional probability	<ul style="list-style-type: none"> • How do probabilities of different events effect each other? • How can we use Venn diagrams to explain connections between data? • How do we create 2-way tables to model real life situations? 	<ul style="list-style-type: none"> • Recognize and explain conditional probability and independence in everyday situations. • Find conditional and independent probability of real-life situations and interpret the probability in context of the situation. 	<ul style="list-style-type: none"> • Explain why probabilities can change due to one event effecting another 		<ul style="list-style-type: none"> • Homework, quizzes, projects

	Addition rule	<ul style="list-style-type: none"> • What are mutually exclusive events? • How do we find probabilities of multiple events, inclusively or exclusively? 	<ul style="list-style-type: none"> • Use sample spaces and Venn diagrams to demonstrate the probability of one or two events happening, either exclusively or inclusively. • Understand the probability of one or both of two events happening. • Apply the Addition Rule to determine the probability of one or both of two events happening. 	<ul style="list-style-type: none"> • Calculate probabilities of inclusive and exclusive events 		<ul style="list-style-type: none"> • Homework, quizzes
	Modeling real life	<ul style="list-style-type: none"> • How do we apply the rules of probability to interpret real life modeling? 	<ul style="list-style-type: none"> • Solve real-life situations involving the probability of one or both of two events occurring, and interpret the answer in the context of the situation modeled. 	<ul style="list-style-type: none"> • Determine what operation to use to find probabilities in different contexts 		<ul style="list-style-type: none"> • Homework, projects, Unit Test
REGENTS EXAM					June	

COURSE: Introduction to Algebra 2 / Trigonometry
GRADE LEVEL: 12th Grade

*Reviewing Old Skills and Practicing New Skills
 Introducing New Skills
 Mastering Skills

MAIN/GENERAL TOPIC:	SUB-TOPIC:	ESSENTIAL QUESTIONS:	*	WHAT THE STUDENTS WILL KNOW OR BE ABLE TO DO:	SKILLS:	WHEN STUDENT DOES IT:	ASSESSMENTS:
ALGEBRA	Real Numbers	<ul style="list-style-type: none"> • What is a real number, a rational number, and an irrational number? 	R M	<ul style="list-style-type: none"> • Define rational, irrational, and real numbers. 	<ul style="list-style-type: none"> • Explain the Real Number system 	Sept.	<ul style="list-style-type: none"> • Mini quizzes
	Properties	<ul style="list-style-type: none"> • How can properties of real numbers help us to evaluate numerical expressions? • What is the order of operations? 	R M	<ul style="list-style-type: none"> • Define closure, commutative, associative, distributive, identity, and inverse properties. • Use PEMDAS to simplify numerical expressions. 	<ul style="list-style-type: none"> • Recognize properties and their appropriate use 		<ul style="list-style-type: none"> • Mini quizzes
	Polynomials	<ul style="list-style-type: none"> • What is the degree of a polynomial? • What are a monomial, a binomial, a trinomial, and a polynomial? 	R I	<ul style="list-style-type: none"> • Determine the degree of a polynomial. • Define monomial, binomial, trinomial, polynomial. • Put a polynomial in standard form. 	<ul style="list-style-type: none"> • Write the degree and type of a polynomial in standard form. 		
	Operations	<ul style="list-style-type: none"> • How do we add, subtract, multiply, and divide with polynomials? 	R I M	<ul style="list-style-type: none"> • Find the sum, difference, product, quotient (no long division) of polynomial expressions containing rational coefficients. 	<ul style="list-style-type: none"> • Add, subtract, multiply, divide polynomials using laws of exponents. 		<ul style="list-style-type: none"> • Quiz
	Factoring	<ul style="list-style-type: none"> • How do we factor polynomial expressions completely? 	R I M	<ul style="list-style-type: none"> • Factor polynomial expressions completely using any combination of GCF, difference of squares, and reverse FOIL and by grouping. 	<ul style="list-style-type: none"> • Factor binomials and trinomials. 	Sept/Oct	Test
ALGEBRA	Rational Expressions	<ul style="list-style-type: none"> • What is a rational expression? • How do we add, subtract, multiply and divide rational expressions? 	R I M	<ul style="list-style-type: none"> • Find the LCD of fractions. • Simplify and determine what makes rational expressions undefined. • Perform arithmetic operations with rational expressions. 	<ul style="list-style-type: none"> • Add, subtract, multiply & divide rational expressions. 		

	Complex Fractions	<ul style="list-style-type: none"> • What makes a fraction complex? • How do we simplify complex fractions? 	R I	<ul style="list-style-type: none"> • Simplify complex fractions by multiplying by the LCD. 	<ul style="list-style-type: none"> • Use LCD to simplify. 		<ul style="list-style-type: none"> • Test
	Roots and Radicals	<ul style="list-style-type: none"> • How is a cube root different from a square root? • What is an index and a radicand? 	R I	<ul style="list-style-type: none"> • Simplify radical expressions with numbers and variables of different indices. 	<ul style="list-style-type: none"> • Use factoring trees to simplify roots higher than 2. 		
	Operations with Radicals	<ul style="list-style-type: none"> • How do we add, subtract, multiply, divide with radicals? 	R I	<ul style="list-style-type: none"> • Define like vs. unlike radicals. • Perform all arithmetic operations on radicals. 	<ul style="list-style-type: none"> • Add, subtract, multiply, divide radicals. 		<ul style="list-style-type: none"> • Quiz
	Rationalize Denominators with Radicals	<ul style="list-style-type: none"> • Why and how do we simplify a rational expression with a radical denominator? 	R I	<ul style="list-style-type: none"> • Rationalize denominators involving algebraic radical expressions. 	<ul style="list-style-type: none"> • Use the conjugate to rationalize the denominator. 		<ul style="list-style-type: none"> • Test
	Linear Equations of a Single Variable	<ul style="list-style-type: none"> • How do we solve linear equations? 	R I M	<ul style="list-style-type: none"> • Solve/check linear equations. • Write/solve equations for real world problems. 	<ul style="list-style-type: none"> • Use graphing calculator to solve equations. 		
	Linear Inequalities of a Single Variable	<ul style="list-style-type: none"> • How do we solve and graph a linear inequality? • How do we solve and graph linear compound inequalities? • How do we graph inequalities on the calculator? 	i	<ul style="list-style-type: none"> • Solve/graph linear inequalities. • Solve/graph linear compound inequalities • Graph linear inequalities on the number line • Write/solve inequalities for real world problems 	<ul style="list-style-type: none"> • Use negative rule when solving linear inequalities. • Graph solutions on number line 	Oct/Nov	<ul style="list-style-type: none"> • Quiz

	Absolute Value Equations & Inequalities	<ul style="list-style-type: none"> • How do we solve an absolute value equation and inequality algebraically and graphically? 	R I	<ul style="list-style-type: none"> • Solve algebraically and graphically an absolute value equation and inequality involving linear expressions in one variable • Check solutions for extraneous roots 	<ul style="list-style-type: none"> • Model & solve problems that involve absolute value equations & inequalities 		<ul style="list-style-type: none"> • Quiz
	Quadratic Equations	<ul style="list-style-type: none"> • How do we solve quadratic equations? • What different ways can be used to solve quadratic equations? 	R I M	<ul style="list-style-type: none"> • Solve quadratic equations by factoring, square root, graphing, completing the square, and the quadratic formula. • Write a quadratic equation using the sum/product of the roots. 	<ul style="list-style-type: none"> • Solve a quadratic equation. • Given the roots, write a quadratic equation. 		<ul style="list-style-type: none"> • Quiz
	Rational Equations	<ul style="list-style-type: none"> • What makes an equation a rational equation? • How do we solve a fractional equation using the LCD? 	R I	<ul style="list-style-type: none"> • Solve fractional equations using LCD method and check for extraneous roots. • Solve work application problems with fractional equations. 	<ul style="list-style-type: none"> • Use LCD method to solve. • Use the TI 83+ to solve. 		
	Radical Equations	<ul style="list-style-type: none"> • How do you solve an equation with a radical? • What is an extraneous root? 	R I	<ul style="list-style-type: none"> • Solve equations containing radicals • Check for extraneous roots algebraically and graphically 	<ul style="list-style-type: none"> • Find the solution set of a radical equation • Use TI 83+ 		<ul style="list-style-type: none"> • Test
FUNCTIONS	Relations & Functions	<ul style="list-style-type: none"> • What is domain? • What is range? • What is the difference between a relation and function? 	R I	<ul style="list-style-type: none"> • Define a relation, function, domain, range, independent & dependent variables. • Determine when a relation is a function. • Determine the domain and range of a function from an equation or a finite set relation. • Recognize a function from a mapping, a table of values, and an equation. 	<ul style="list-style-type: none"> • $x =$ domain • $y =$ range • Find the rule for a function. 	Nov/Dec	

	Graphs of Functions	<ul style="list-style-type: none"> • How can you tell if a graph is a function? 	R I	<ul style="list-style-type: none"> • Determine if the graph of a relation is a function. • Determine domain and range from graphs. 	<ul style="list-style-type: none"> • Use the VLT. 		
	Real Life Graphs	<ul style="list-style-type: none"> • Can you recognize a graph of a real life situation? 	R I	<ul style="list-style-type: none"> • Relate graphs of functions to real life. 	<ul style="list-style-type: none"> • Match a graph to a situation. 		<ul style="list-style-type: none"> • Supplementary Worksheet
	Function Notation	<ul style="list-style-type: none"> • What does $f(x)$ mean? 	I	<ul style="list-style-type: none"> • Write functions in function notation. • Use function notation to evaluate functions for given values in the domain 	<ul style="list-style-type: none"> • Find $f(\#)$ • $Y = f(x)$ 		
	Mappings	<ul style="list-style-type: none"> • What is a one-to-one mapping? • What is an onto mapping? 	I	<ul style="list-style-type: none"> • Determine if a mapping is one-to-one, onto, or both. 	<ul style="list-style-type: none"> • Describe a function as 1-1 or onto or both. • Use VLT and HLT to determine 1-1. 		<ul style="list-style-type: none"> • Quiz
	Variation-Direct	<ul style="list-style-type: none"> • What is a direct variation? 	I	<ul style="list-style-type: none"> • Use direct variation to solve for unknown values. • Determine when to use direct variation for real world problems. 	<ul style="list-style-type: none"> • Use a proportion for direct variations • Know the graph for direct variation. 		<ul style="list-style-type: none"> • Golden Ratio Activity
	Types of Functions	<ul style="list-style-type: none"> • Can you identify the different types of functions? 	R I	<ul style="list-style-type: none"> • Identify types of functions algebraically & graphically <ul style="list-style-type: none"> - linear - constant - absolute value - quadratic - polynomial - step • Use the graphing calculator to graph the different types of functions 	<ul style="list-style-type: none"> • Name and use the graphs of the different types of functions • Graph functions on a graphing calculator 	Nov/Dec	<ul style="list-style-type: none"> • Quiz

	Transformation of Functions	<ul style="list-style-type: none"> How do transformations affect the equations of relations? 	I	<ul style="list-style-type: none"> Perform transformations with functions and relations: $f(x + a)$, $f(x) + a$, $f(-x)$, $-f(x)$, $af(x)$ on graphs of absolute value, parabolas, lines, and circles. Identify the equations for the different transformations of absolute value, parabolas, lines, and circles 	<ul style="list-style-type: none"> Use point-slope form of a line. Use vertex form of a parabola. 		
	Algebra of Functions	<ul style="list-style-type: none"> How do we perform basic operations with 2 functions? 	I	<ul style="list-style-type: none"> Add, subtract, multiply, divide with $f(x)$ and $g(x)$. 	<ul style="list-style-type: none"> Find $f(x) + g(x)$, etc 		
	Composition of Functions	<ul style="list-style-type: none"> What does $f \circ g(x)$ mean? 	I	<ul style="list-style-type: none"> Find the composition of functions using $f \circ g(x)$ or $f(g(x))$. Determine the inverse of a function and use composition to justify the result. 	<ul style="list-style-type: none"> Find $f \circ g(\#)$ Find $f(g(\#))$ Find $f(g(x))$ Find $f \circ f^{-1}(x)$ 		
	Inverse of a Function	<ul style="list-style-type: none"> How do you find the inverse of a function? What is the notation for inverse of a function? 	I	<ul style="list-style-type: none"> Find the inverse of a function numerically, algebraically and graphically. Graphically determine if the inverse is also a function by using the HLT. 	<ul style="list-style-type: none"> Find $f^{-1}(x)$ and graph it. Use HLT. 		
	Variation-Inverse	<ul style="list-style-type: none"> What is an inverse variation? 	I	<ul style="list-style-type: none"> What is the difference between direct and inverse variations? 	<ul style="list-style-type: none"> Use $xy = k$ for inverse variations Know graphs for inverse variation 	Nov/Dec	<ul style="list-style-type: none"> Test
ALGEBRA	Real Roots	<ul style="list-style-type: none"> What is a real root? What is the square root property? Where are the roots of polynomial graphs? 	I	<ul style="list-style-type: none"> Solve for real roots using the square root property and by using the graphing technique. 	<ul style="list-style-type: none"> Determine the real roots using algebra and graphing techniques. 		

	Completing the square	<ul style="list-style-type: none"> • How do we complete the square of a quadratic trinomial? 	I	<ul style="list-style-type: none"> • Solve a quadratic equation by completing the square. 	<ul style="list-style-type: none"> • Find solutions of quadratic equations. 		
	Circles in Center-Radius Form	<ul style="list-style-type: none"> • How do we use completing the square to write circles in center-radius form? 	I	<ul style="list-style-type: none"> • Write the equation of a circle in center radius form using completing the square • Use $(x - h)^2 + (y - k)^2 = r^2$ form of a circle. 	<ul style="list-style-type: none"> • Determine the center and radius of a circle in standard form 		
	Quadratic Formula with real roots	<ul style="list-style-type: none"> • How do we use the Quadratic Formula? 		<ul style="list-style-type: none"> • Determine when and how to use the Quadratic Formula to solve equations that are not factorable. 	<ul style="list-style-type: none"> • Determine the real roots of any equation. 		
	Imaginary Numbers	<ul style="list-style-type: none"> • How do we take the square root of -15? • What makes a number imaginary? 	I	<ul style="list-style-type: none"> • Write square roots of negative numbers in terms of i. • Simplify powers of i. 	<ul style="list-style-type: none"> • Simplify i^n • Use "I won I won" • Rewrite a radical involving the imaginary unit. 		
	Complex Numbers	<ul style="list-style-type: none"> • What makes a number a complex number? • How do we graph a complex number? 	I	<ul style="list-style-type: none"> • Recognize the hierarchy of the complex number system. • Write a number in $a + bi$ form. • Graph complex numbers in the Argand plane. 	<ul style="list-style-type: none"> • Sketch complex numbers in the complex number plane. 		<ul style="list-style-type: none"> • Quiz
	Operations with Complex Numbers	<ul style="list-style-type: none"> • Can you perform all operations with complex numbers? • How do you simplify a rational number whose denominator is a complex number? • Can you graph the sum/difference of 2 complex numbers? 	R I	<ul style="list-style-type: none"> • +, -, x, ÷ with complex numbers • Find the conjugate of a complex number • Rationalize the denominator containing a complex number • Graph the sum/difference of 2 complex numbers using vectors 	<ul style="list-style-type: none"> • Do the basic operations with complex numbers • Write the conjugate of a complex number • Model the sum/difference of 2 complex numbers using vectors on the Argand plane 	Jan	

	Quadratic formula with imaginary roots	<ul style="list-style-type: none"> • Can you solve quadratic equations whose roots are imaginary? 	I	<ul style="list-style-type: none"> • Solve quadratic equations using the quadratic formula resulting in imaginary roots 	<ul style="list-style-type: none"> • Find the solutions of quadratic equations having imaginary roots 		<ul style="list-style-type: none"> • Quiz
	Nature of roots using the discriminant	<ul style="list-style-type: none"> • Can you describe the roots and graphs of quadratic equations using the discriminant? 	R I	<ul style="list-style-type: none"> • Describe the nature of the roots & graphs of quadratic equations using the discriminant 	<ul style="list-style-type: none"> • Use $b^2 - 4ac$ 		<ul style="list-style-type: none"> • Chart Activity • Test
	Sum & product of roots	<ul style="list-style-type: none"> • Can you find the sum and product of the roots without solving the equation? 	R I	<ul style="list-style-type: none"> • State and use the sum/product of the roots formulas • Use the sum/product of the roots to write the quadratic equation 	Use $S = -b/a$ and $P=c/a$ Write quadratic equations using sum and product		
	Higher Degree Polynomials	<ul style="list-style-type: none"> • How do we solve polynomials of higher degrees? 	I R	<ul style="list-style-type: none"> • Find the solution to polynomial equations of higher degree that can be solved using factoring and/or the quadratic formula and/or graphing. 	<ul style="list-style-type: none"> • Solve equations similar to $x^4 - 4x^2 = 0$. 		<ul style="list-style-type: none"> • Test
	System of equations	<ul style="list-style-type: none"> • Can you solve a system of linear-quadratic equations algebraically and graphically? 	R I	Find the solution of a system of linear-quadratic equations by substitution, elimination (addition/subtraction), and graphing. Check for extraneous roots.	Solve systems of equations Use the TI-83		<ul style="list-style-type: none"> • In class project
	Parabolas	<ul style="list-style-type: none"> • What are the different ways to graph a parabola? 	R I	<ul style="list-style-type: none"> • Use $y = ax^2 + bx + c$ • Use $x = -b/2a$ for the axis of symmetry • Create a table of values and graph 	<ul style="list-style-type: none"> • Graph using standard form. • Find vertex and axis of symmetry • Match equation to the graph. 		

Prepare for the midterm

ALGEBRA	Recursive Sequence	<ul style="list-style-type: none"> • What does recursive mean? 	I	<ul style="list-style-type: none"> • Specify terms of a sequence by its recursive definition. 	<ul style="list-style-type: none"> • Find terms and rules for sequences 	Feb	
	Sequences	<ul style="list-style-type: none"> • What is a sequence? 	I	<ul style="list-style-type: none"> • Determine subsequent terms in a pattern. • Determine an explicit rule for a sequence. 	<ul style="list-style-type: none"> • Find terms and rules for sequences. 		
	Sigma Notation	<ul style="list-style-type: none"> • What does Σ mean and how is it used? 	I	<ul style="list-style-type: none"> • Define summation, index, lower & upper limit. • Find the value of a summation expression. • Represent the sum using sigma notation. 	<ul style="list-style-type: none"> • Find numerical value of a sum with sigma notation. 		
	Arithmetic Sequences	<ul style="list-style-type: none"> • What makes a sequence arithmetic? 	I	<ul style="list-style-type: none"> • Determine the common difference in an arithmetic sequence. • Find and use the formula for the nth term. • Determine a specific term. 	<ul style="list-style-type: none"> • Find d, n and $a(0)$ and $a(n)$. 		<ul style="list-style-type: none"> • Quiz
	Arithmetic Series	<ul style="list-style-type: none"> • What does the term, series, mean? • Is there a formula for the sum of n terms of an arithmetic series? 	I	<ul style="list-style-type: none"> • Determine the sum of the first n terms of an arithmetic series. • Use the formula for an arithmetic sum. 	<ul style="list-style-type: none"> • Find $S(n)$ 	Feb/Mar	
	Geometric Sequences	<ul style="list-style-type: none"> • What makes a sequence geometric? • Is a geometric sequence a linear or exponential model? 	I	<ul style="list-style-type: none"> • Determine the common ratio of a geometric sequence. • Find and use the formula for the nth term. • Determine a specific term. 	<ul style="list-style-type: none"> • Find r, n, $a(0)$, $a(n)$. 		
	Geometric Series	<ul style="list-style-type: none"> • Is there a formula for the sum of n terms of a geometric series? 	I	<ul style="list-style-type: none"> • Determine the sum of the first n terms of a geometric series. • Use the formula for a geometric sum. 	<ul style="list-style-type: none"> • Find $S(n)$ 		<ul style="list-style-type: none"> • Test

ALGEBRA	Laws of Exponents	<ul style="list-style-type: none"> • What do zero and negative exponents mean? 	R I	<ul style="list-style-type: none"> • Simplify exponential expressions using product/quotient/power rules • Simplify exponential expressions involving zero and negative exponents. 	<ul style="list-style-type: none"> • Use the rules of exponents. 		
		<ul style="list-style-type: none"> • What are the laws of exponents? 	R I	<ul style="list-style-type: none"> • Rewrite algebraic expressions that contain negative exponents using only positive exponents. 	<ul style="list-style-type: none"> • Use a graphing calculator and make judicious use of parentheses. 		
	Fractional Exponents and Equations	<ul style="list-style-type: none"> • What does a fractional exponent mean? • How to solve with variable bases & fractional exponents? 	R I	<ul style="list-style-type: none"> • Rewrite algebraic expressions with fractional exponents as radical expressions and vice versa. • Solve equations with variable bases with fractional exponents. 	<ul style="list-style-type: none"> • Evaluate an expression and solve equations with fractional exponent. 		
	Exponential Equations	<ul style="list-style-type: none"> • How do you solve an exponential equation using like bases? 	I	<ul style="list-style-type: none"> • Solve exponential equations by changing to like bases. 	<ul style="list-style-type: none"> • Rewrite equations with like bases & solve for the exponent. 		<ul style="list-style-type: none"> • Quiz
	Real World Applications	<ul style="list-style-type: none"> • How do we solve real world problems? 	I	<ul style="list-style-type: none"> • Solve real world problems using exponential equations 	<ul style="list-style-type: none"> • Use the different exponential formulas 	Mar	
	Inverse of Exponential Functions & Log Graphs	<ul style="list-style-type: none"> • What is the inverse of an exponential function? • What is the relationship between exponential and log functions and graphs? 	I	<ul style="list-style-type: none"> • Write the inverse of an exponential function and of a log function. • Graph the inverse of an exponential or of a log function. 	<ul style="list-style-type: none"> • Sketch a log function's graph and its inverse. 		
	Logarithms	<ul style="list-style-type: none"> • Why is a log an elusive exponent? • What is e? • How do you convert from exponential form 	I	<ul style="list-style-type: none"> • Define logarithm, common log & natural log • Convert between exponential and log forms • Explain difference between 	<ul style="list-style-type: none"> • Rewrite the equality $\log_b a = c$ as $a = b^c$ 		<ul style="list-style-type: none"> • Elusive exponent packet

		to log form?		common & natural logs?			
	Log Properties	<ul style="list-style-type: none"> • What are the product/quotient/power rules for logs? • Can you convert from exponential to log form and vice versa? 	I	<ul style="list-style-type: none"> • Know and apply the 3 log properties to rewrite log expressions in equivalent forms. • Evaluate log expressions in any base using the change-of-base formulas. 	<ul style="list-style-type: none"> • Use the log rules for performing calculations of exponents & logs. 		
	Common and natural logs	<ul style="list-style-type: none"> • What is a common log, an anti-log? • How do you find the log of a number on a calculator? 	I	<ul style="list-style-type: none"> • Define common log • Define natural log • Define anti-log • Use a calculator to find logs and anti-logs 	<ul style="list-style-type: none"> • Use TI-83+ with logs. 		<ul style="list-style-type: none"> • Quiz
	Exponential Equations	<ul style="list-style-type: none"> • How do we solve exponential equations using logs? 	I	<ul style="list-style-type: none"> • Use logs and a calculator to solve exponential equations where bases are not integral powers of the same base. 	<ul style="list-style-type: none"> • Use TI 83+ and logs. 		
	Log Equations	<ul style="list-style-type: none"> • How do you solve a log equation? 	I	<ul style="list-style-type: none"> • Use log rules and a calculator to solve log equations. 	<ul style="list-style-type: none"> • Use TI83+ to solve a log equation. 	Mar/Apr	
	Real World Applications	<ul style="list-style-type: none"> • How does the Richter scale use logs? • Where else are logs used in real life? 	I	<ul style="list-style-type: none"> • Recognize a variety of phenomena can be modeled by same type of function: interest problems, decay, and population growth. 	<ul style="list-style-type: none"> • Select the most efficient equations: exponential or log.. 		<ul style="list-style-type: none"> • Test
TRIGONOMETRY	Right triangle trigonometry	<ul style="list-style-type: none"> • Can you find all the sides and angles of a right triangle? 	R I M	<ul style="list-style-type: none"> • Apply Pythagoras to solve right triangle problems. • Apply principles of SOH-CAH-TOA to solve right triangle problems. 	<ul style="list-style-type: none"> • Use SOH-CAH-TOA • Use Pythagorean theorem 		

	Special Right Triangles	<ul style="list-style-type: none"> • Can you use the special right triangle proportions to find the trig values in any quadrant? 	R I	<ul style="list-style-type: none"> • Find trig. function values for 30, 45, 60 degree angles in all quadrants 	<ul style="list-style-type: none"> • Use 1: $\sqrt{3}$: 2 and 1:1:$\sqrt{2}$ 		<ul style="list-style-type: none"> • Quiz
	Degree Measure	<ul style="list-style-type: none"> • Can you find the angle given the trig value with/without a calculator? • How do you convert decimal angle measurements to minutes and seconds? 	R I	<ul style="list-style-type: none"> • Convert from DD\leftrightarrow DMS • Find angle measures using inverse trig functions. 	<ul style="list-style-type: none"> • Use the TI-83+ • Find \sin^{-1}, \cos^{-1}, \tan^{-1} 		
	Radians	<ul style="list-style-type: none"> • What's a radian? • Can you convert radians \leftrightarrow degrees? 	I	<ul style="list-style-type: none"> • Define radian • Convert radians \leftrightarrow degrees • Find one of the three: radius, central angle, or intercepted arc. 	<ul style="list-style-type: none"> • Use formulas for converting from degrees to radians • Use $s = \theta r$. 		<ul style="list-style-type: none"> • Quiz
TRIGONOMETRY	Law of Cosines	<ul style="list-style-type: none"> • What is an oblique triangle? • How to find a side or angle in an oblique \blacktriangle 	I	<ul style="list-style-type: none"> • Find an unknown side or angle using the Law of Cosines. 	<ul style="list-style-type: none"> • Solve a triangle using law of cosines • Use the TI-83 		
	Law of Sines	<ul style="list-style-type: none"> • How do you find a side or angle in an oblique SAS or ASA triangle? 	I	<ul style="list-style-type: none"> • Find unknown sides or angles using the Law of Sines. 	<ul style="list-style-type: none"> • Solve a triangle using law of sines • Use the TI-83+ 	Apr/May	
	Area of Triangle	<ul style="list-style-type: none"> • Can you find the area of a triangle knowing SSS and SAS? 	I	<ul style="list-style-type: none"> • Find the area of triangles using Hero's formula or $K = \frac{1}{2} ab \sin C$ 	<ul style="list-style-type: none"> • Calculate the area of a triangle 		<ul style="list-style-type: none"> • Quiz
	Force vectors	<ul style="list-style-type: none"> • What is a force, a resultant, and a magnitude? • Can you solve real world problems 	I	<ul style="list-style-type: none"> • Define force, resultant, magnitude • Calculate a force or angle involving two forces using the parallelogram method 	<ul style="list-style-type: none"> • Model a real world situation using vectors with the parallelogram method to solve 		

		involving forces by using the parallelogram method?			the triangle • Use the TI-83+		
	Real world Applications	• Can you solve a triangular situation using Law of Cosines / Sines ?	l	• Use Laws of Cos/Sin to solve real world situations • Apply angles of elevation & depression to model triangular situations	• Solve and model real world situations • Use the TI-83+		• Test
STATISTICS	Data Collection	• What is the difference between a sample and a population?	R i	• State the differences among various kinds of studies (e.g., survey, observation, controlled experiment). • Determine the factors which may affect the outcome of a survey.	• Identify bias in a sampling method. • Find the margin of error for a sample population.		
	Measures of Central Tendency	• What are the three measures of central tendency? • What is quartile?	R l	• Define mean, median, mode • Find median and mode. • Find the 1 st , 2 nd & 3 rd quartiles, interquartile range of a set of data.	• Find mean, median, mode, quartiles, and interquartile range using TI-83+.		
	Measures of Dispersion	• What are the measures of dispersion?	i	• Find range, mean absolute deviation, variance & sd with a group frequency distributions. • Explain the difference between sample vs population	• Use your TI-83+ to find the measures of dispersion.		• Quiz
	Normal Distribution	• What is a normal distribution? • Can you sketch the normal curve (bell curve)? • What is a percentile?	i	• Sketch the normal curve using the mean and standard deviation. • Use percentages associated with the normal distribution. • Find percentiles of a normal distribution.	• Apply the normal curve and its properties to real-world situations.	May	
	Two-valued statistics (Regressions)	• What is a scatter plot? • What does a correlation coefficient mean? • What is a line of best fit (regression line)?	l	• Sketch a scatter plot • Find a line or curve (logarithmic, exponential, or power regressions) of best fit. • Find the correlation coefficient. • Interpret within the regression	• Use the graphing calculator to find a scatter plot, line/curve of best fit, correlation coefficient of real-		• Correlation coefficient activity. • Test

		<ul style="list-style-type: none"> • What is a curve of best fit? • What is bivariate stats? 		<ul style="list-style-type: none"> • model (interpolate from the data). • Make predictions with line or curve of best fit (extrapolate from data). 	world situations.		
PROBABILITY	Permutations & Combinations	<ul style="list-style-type: none"> • What is the difference between permutations and combinations? 	R I	<ul style="list-style-type: none"> • Know when to use a permutation (with and without repetition) or combination. • Evaluate factorials, permutations & combinations. • Use permutations, combinations, and the Counting Rule to determine the number of elements in a sample space and a specific subset (event). 	<ul style="list-style-type: none"> • Use the TI-83+ to find factorials, permutations and combinations. 		
	Probability with One Outcome	<ul style="list-style-type: none"> • How do you use permutations & combinations to find probabilities? 	R I	<ul style="list-style-type: none"> • Determine probabilities using permutations & combinations. • Calculate empirical and theoretical probabilities, including geometric applications. 	<ul style="list-style-type: none"> • Find the probability of an event with one outcome. 		<ul style="list-style-type: none"> • Quiz
	Probability with Two Outcomes (Bernoulli Experiment)	<ul style="list-style-type: none"> • How do you use combinations to find probabilities with 2 outcomes in real-world situations? 	R I	<ul style="list-style-type: none"> • Determine the probability of <i>exactly</i> r successes in n trials using Bernoulli formula • Determine the probability of <i>at least/at most</i> r successes in n trials using Bernoulli formula 	<ul style="list-style-type: none"> • Use the TI-83+ to find binomial probabilities. 		
	Binomial Expansions	<ul style="list-style-type: none"> • What is Pascal's Triangle? • How do you expand a binomial using Pascal's Triangle or combinations? 	I	<ul style="list-style-type: none"> • Expand a binomial expression raised to any power. • Find any term of a binomial expression raised to any power. 	<ul style="list-style-type: none"> • Write the binomial expansion of $(x + y)^n$ • Write the "r"th term of $(x + y)^n$ 	May/June	<ul style="list-style-type: none"> • Test

Prepare for the Integrated Algebra 2/ Trigonometry Regents.

COURSE: Applied Math
GRADE LEVEL: 12

***Reviewing Old Skills and Practicing New Skills**
Introducing New Skills
Mastering Skills

MAIN/GENERAL TOPIC:	SUB-TOPIC:	ESSENTIAL QUESTIONS:	*	WHAT THE STUDENTS WILL KNOW OR BE ABLE TO DO:	SKILLS:	WHEN STUDENT DOES IT:	ASSESSMENTS:
ARITHMETIC	Operations: Add, subtract, multiplication, division	<ul style="list-style-type: none"> How is math relevant to me? How do mathematical operations relate to each other? 	R M	<ul style="list-style-type: none"> To add, subtract, multiply and divide whole numbers, decimals and fractions without a calculator To use operations dealing with money 	<ul style="list-style-type: none"> Understand and apply regrouping Understand lattice multiplication Basic operations with fractions 	Sept	<ul style="list-style-type: none"> Worksheets
	Percentages	<ul style="list-style-type: none"> Why are percentages important? Where would we use percentages in the real world? 	R M	<ul style="list-style-type: none"> To apply the calculation of percentages to finding discounts, taxes, and deductions. 	<ul style="list-style-type: none"> Estimate percentages without using a calculator 	Sept	<ul style="list-style-type: none"> Worksheets
	Fractions, Ratios, and proportions	<ul style="list-style-type: none"> Where do we see fractions in real life? How do we use ratios/proportions to scale measurements? 	R M	<ul style="list-style-type: none"> To use fractions in concepts such as similarity and scale models 	<ul style="list-style-type: none"> Calculate sizes of similar figures using ratios 	Sept	<ul style="list-style-type: none"> Packet
	Symmetry	<ul style="list-style-type: none"> What does it mean for an object to be symmetric? 	R M	<ul style="list-style-type: none"> Identify and perform point, line, and rotational symmetry 	<ul style="list-style-type: none"> Use rules of symmetry 	Sept	<ul style="list-style-type: none"> Packet
	Perspectives (3-dimensional drawings)	<ul style="list-style-type: none"> How can drawings help people do their jobs? 	I	<ul style="list-style-type: none"> Draw basic geometric shapes in 2- and 3-dimensional views (isometric, orthographic, & 2 point perspective techniques) 	<ul style="list-style-type: none"> Draw projections of 3 dimensional objects 	Sept	<ul style="list-style-type: none"> Packet

REAL WORLD APPLICATIONS	Scale Models	<ul style="list-style-type: none"> When is it beneficial to use a scale model to design a life-sized object? 	I	<ul style="list-style-type: none"> Design a scale-model for an outdoor situation Find the cost of the model completed 	<ul style="list-style-type: none"> Apply operations and similarity concepts to scale models 	Sept	<ul style="list-style-type: none"> Project
	Career Zone	<ul style="list-style-type: none"> What jobs utilize these skills? 	I	<ul style="list-style-type: none"> Utilize Career Zone website to search for skills and jobs 	<ul style="list-style-type: none"> Match skills to jobs using Career Zone 	Sept	<ul style="list-style-type: none"> Class lab
MEASUREMENT CONVERSIONS	Liquids	<ul style="list-style-type: none"> What different measurements do we have to measure liquids? 	R	Know measurements pertaining to liquids (i.e., fluid ounces, teaspoon, tablespoon, cup, pint, etc)	Recognize size relations	Oct	<ul style="list-style-type: none"> Packet
		<ul style="list-style-type: none"> How do we convert from smaller units to larger units and vice-versa? When is it necessary to use measurement conversions? 	R	<ul style="list-style-type: none"> Convert from one measurement to another (i.e., teaspoons to cups, quarts to pints, etc) Increasing or decreasing recipe amounts 	<ul style="list-style-type: none"> Calculate conversions using measurement ratios 	Oct	<ul style="list-style-type: none"> Packet
	Dry solids	<ul style="list-style-type: none"> What different measurements do we have to measure dry solids? 	R	<ul style="list-style-type: none"> Know measurements pertaining to dry solids (i.e., teaspoon, tablespoon, cup, ounces, etc) 	<ul style="list-style-type: none"> Recognize size relations 	Oct	<ul style="list-style-type: none"> Packet
		<ul style="list-style-type: none"> Why do we need to know how to convert from one scaled unit to another? When is it necessary to use measurement conversions? 	R	<ul style="list-style-type: none"> Convert from one measurement to another (i.e., teaspoons to cups, pounds to ounces, etc) Increasing or decreasing recipe amounts 	Calculate conversions using measurement ratios	Oct	<ul style="list-style-type: none"> Packet
	Real-world applications	Can you determine ingredient amounts for different recipes?	R	Determine needed ingredients for class-sized recipes based on family-sized recipes	Use proportions with conversions	Oct	Project

	Weight	<ul style="list-style-type: none"> How do we convert smaller to larger units and vice versa? Can we determine the appropriate measurement for applied situations? 		<ul style="list-style-type: none"> Conversions between ounces, pounds and tons Determine the appropriate measurement for a given scenario 	<ul style="list-style-type: none"> Use proportions for conversions 	Oct	<ul style="list-style-type: none"> Packet Quiz
	Length	<ul style="list-style-type: none"> How do we measure to the nearest $\frac{1}{4}$, $\frac{1}{8}$, and $\frac{1}{16}$ inch How do we convert smaller to larger units and vice versa? 		<ul style="list-style-type: none"> Conversions between inches, feet and yards Determine the appropriate measurement for a given scenario Measuring objects to the nearest given unit 	Use proportions for conversions	Oct	<ul style="list-style-type: none"> Packet Quiz
	Metric	<ul style="list-style-type: none"> When is it necessary to use metric conversions? 	R	<ul style="list-style-type: none"> Convert from English to metric and metric to English (conversion.com) Convert using estimations 	<ul style="list-style-type: none"> Use online conversion.com to verify manual conversions 	Oct	<ul style="list-style-type: none"> Worksheet
		<ul style="list-style-type: none"> What is process of determining cost of fuel for a trip? 	R	<ul style="list-style-type: none"> Calculate fuel cost of a trip involving both U.S. and Canadian travel (metric and English measurements involved) 	<ul style="list-style-type: none"> Use ratios with cost, distance, quantity 	Oct	<ul style="list-style-type: none"> Project
		<ul style="list-style-type: none"> What type of careers would have to know how to convert measurements? 		<ul style="list-style-type: none"> Search using Career Zone to find what jobs utilize these skills 	<ul style="list-style-type: none"> Match skills with jobs 	Oct	<ul style="list-style-type: none"> Class lab
GEOMETRY	Measurements of Polygons	<ul style="list-style-type: none"> What is the difference between perimeter and area? 	R	<ul style="list-style-type: none"> Determine when it is appropriate to use perimeter and area Calculate perimeter and area 	Use appropriate formulas	Nov	<ul style="list-style-type: none"> Packet
	Measurements of Circles	<ul style="list-style-type: none"> What is the difference between circumference and area? 	R	<ul style="list-style-type: none"> Determine when it is appropriate to use circumference and area Calculate circumference and area 	<ul style="list-style-type: none"> Use appropriate formulas 	Nov	<ul style="list-style-type: none"> Packet Quiz

	Measurements of Solids	What is the difference between surface area and volume?	R	<ul style="list-style-type: none"> Determine when it is appropriate to use surface area and volume Calculate surface area and volume 	<ul style="list-style-type: none"> Use appropriate formulas 	Nov	<ul style="list-style-type: none"> Packet Quiz
	Measurements of Complex Figures (Area)	<ul style="list-style-type: none"> How do you find the area of a complex shape? How do you find the surface area of a 3 dimensional object? 	R M	<ul style="list-style-type: none"> Apply geometry to solve problems involving area of triangles, quadrilaterals & circles 	<ul style="list-style-type: none"> Use area formulas 	Nov	<ul style="list-style-type: none"> Packet Quiz
	Measurements of Complex Figures (Volume)	<ul style="list-style-type: none"> How do you find the volume of a complex solid? 	R M	<ul style="list-style-type: none"> Apply geometry to solve problems involving volume of geometric solids 	<ul style="list-style-type: none"> Use volume formulas 	Nov	<ul style="list-style-type: none"> Packet
	Nets of Solids	<ul style="list-style-type: none"> Can you determine which net will build each solid? Can you build a solid from a net? Can you find areas and volumes of solids from their nets? 	I	<ul style="list-style-type: none"> Apply formulas to find volumes of given net figures Build 3-dimensional solids from given nets 	<ul style="list-style-type: none"> Use net diagrams to build solids Use volume formulas 	Nov	<ul style="list-style-type: none"> Packet Project
REAL WORLD APPLICATIONS	Scale Models and Budgets	<ul style="list-style-type: none"> How do budget restraints impact designs? 	I	<ul style="list-style-type: none"> Design a scale model for an indoor situation within a budget 	<ul style="list-style-type: none"> Balance design and costs 	Nov	<ul style="list-style-type: none"> Project
LINEAR EQUATIONS	Properties of linear equations	<ul style="list-style-type: none"> What makes an equation linear? What are the parts of a linear equation? 	R M	<ul style="list-style-type: none"> Recognize the parts of a linear equation Identify the constant, the variable, and the coefficient of an equation 	<ul style="list-style-type: none"> Identify parts of a linear equation 	Nov	<ul style="list-style-type: none"> Packet
	Linear equations with one variable	<ul style="list-style-type: none"> How do we solve linear equations? 	R M	<ul style="list-style-type: none"> Simplify and solve an equation Check an equation's solution 	<ul style="list-style-type: none"> Solve linear equations with one variable 	Nov	<ul style="list-style-type: none"> Packet

	Translate word problems into equations	<ul style="list-style-type: none"> What are the steps to change a word problem into an equation? 	R M	<ul style="list-style-type: none"> What words mean add, subtract, multiply, divide & equals Translate a word problem into an equation for solution 	<ul style="list-style-type: none"> Write equations 	Nov	<ul style="list-style-type: none"> Packet
	Linear equations with two variables	<ul style="list-style-type: none"> How do you find solutions for equations with two variables 	R M	<ul style="list-style-type: none"> Set up tables of values for conditional equations Graph tables of values 	<ul style="list-style-type: none"> Compare solutions of one and two variable equations 	Nov	<ul style="list-style-type: none"> Packet Quiz
	Linear equations in the Real World	<ul style="list-style-type: none"> How do we use linear equations in our own life? 	R	<ul style="list-style-type: none"> Identify situations where linear equations may arise Understand what linear equations are showing or may suggest 	Develop and solve linear equations based on life situations	Nov	<ul style="list-style-type: none"> Packet Project
COORDINATE GEOMETRY	Graph data as points	<ul style="list-style-type: none"> How do you graph a point or set of points? 	R M	<ul style="list-style-type: none"> Graph points on the Cartesian coordinate plane (x and y axis) Identify point locations and quadrants 	<ul style="list-style-type: none"> Graph a point Interpret data from a given point 	Nov	<ul style="list-style-type: none"> Class lab
	Graph Linear Equations	<ul style="list-style-type: none"> What does a linear equation show? What is the difference between the dependent and independent variable? 	R M	<ul style="list-style-type: none"> Construct a table of values for an equation or problem Choose an appropriate range and scale for a graph Graph special lines – x axis, y axis, vertical and horizontal line equations Graph lines using $y = mx + b$ 	<ul style="list-style-type: none"> Graph a line given $y = mx + b$ or a table of values Use graphing calculator to aid in graphing lines 	Nov	<ul style="list-style-type: none"> Packet
	Find Slope	<ul style="list-style-type: none"> What is slope and how do you find it? What does the slope tell us? 	R M	<ul style="list-style-type: none"> Find slope of data or a line Explain the difference between positive, negative, zero and undefined slope 	<ul style="list-style-type: none"> Calculate slopes Interpret slopes 	Nov	<ul style="list-style-type: none"> Packet Class lab Quiz
	Find Intercepts	<ul style="list-style-type: none"> What is an axis intercept? 	R M	<ul style="list-style-type: none"> State the intercepts of the x-axis and y-axis of a graph Graph a line give the intercepts 	<ul style="list-style-type: none"> Identify intercept of a line Explain what the values tell us 	Dec	<ul style="list-style-type: none"> Packet Quiz

	Graph nonlinear equations	What makes a graph nonlinear?	R M I	<ul style="list-style-type: none"> Use a table or graphing calculator to graph equations Identify equations or formulas as linear or nonlinear 	<ul style="list-style-type: none"> Graph linear and nonlinear equations 	Dec	<ul style="list-style-type: none"> Packet Quiz
	Real world applications	How do graphs help people on their job?	I	<ul style="list-style-type: none"> Translate a problem into slope intercept form and use it to solve the situation Use formulas in problems to find solution with a table or a graph Prepare graphs to show data and make projections 	<ul style="list-style-type: none"> Extrapolate data from graphs Match skills to jobs on Career Zone 	Dec	<ul style="list-style-type: none"> Class lab Packet Quiz
INEQUALITIES	Order rationals on the number line	<ul style="list-style-type: none"> Can you think of situations where an inequality would be better than an equality? 	R M	Order 2 or more numbers using inequality symbols	Use inequality symbols to order numbers	Dec	<ul style="list-style-type: none"> Packet
	Solve linear inequalities	<ul style="list-style-type: none"> How is solving an inequality the same and different from an equation? 	R M	<ul style="list-style-type: none"> Solve linear inequality in 1 variable algebraically 	<ul style="list-style-type: none"> Solve inequality in 1 variable 	Dec	<ul style="list-style-type: none"> Packet
	Graph linear inequalities	<ul style="list-style-type: none"> How do you graph the solution set for an inequality on the number line? 	R M	Graph the solution set of a linear inequality	<ul style="list-style-type: none"> Graph inequality solution set on a number line 	Dec	<ul style="list-style-type: none"> Packet
	Solve combine inequalities	How do you solve and graph and/or inequalities?	R M	<ul style="list-style-type: none"> Solve inequalities with “and” / “or” 	<ul style="list-style-type: none"> Graph combined inequality solutions on the number line 	Dec	<ul style="list-style-type: none"> Packet Quiz
UNIT 26 SYSTEMS OF EQUATIONS	Solution set of 2 variable equations	<ul style="list-style-type: none"> Can you solve a problem with more than one unknown or one equation? 	R M	Verify the solution set of an open sentence with 2 variables	<ul style="list-style-type: none"> Use substitution to check for solutions with 2 variable 	Dec	<ul style="list-style-type: none"> Packet

	Solution by graphing	<ul style="list-style-type: none"> How do you find a common solution from a graph? 	R M	<ul style="list-style-type: none"> Find system solution by graphing 	<ul style="list-style-type: none"> Use graphing calculator to solve a system of equations 	Dec	<ul style="list-style-type: none"> Packet
	Solution by substitution	How you use substitution to solve a system?	R M	<ul style="list-style-type: none"> Find system solution by substitution 	<ul style="list-style-type: none"> Solve a system by substitution 	Dec	<ul style="list-style-type: none"> Packet
	Solution by elimination	How do you add 2 equations to solve a system?	R M	<ul style="list-style-type: none"> Find system solution by addition/subtraction 	<ul style="list-style-type: none"> Solve a system by addition 	Dec	<ul style="list-style-type: none"> Packet Quiz
	Real world application	<ul style="list-style-type: none"> Can you represent a situation with 2 unknowns as a system and solve it? 	I	Choose a method to solve a system & use it to find an answer	<ul style="list-style-type: none"> Solve a problem with a system of equations 	Dec	<ul style="list-style-type: none"> Packet Quiz
	Graph linear inequalities in 2 variables	<ul style="list-style-type: none"> How do you solve a system of inequalities by graphing? 	R M	Solve a system of linear inequalities	<ul style="list-style-type: none"> Graph solution of a system of inequalities with 2 variables 	Jan	<ul style="list-style-type: none"> Packet
	Solve & graph absolute value inequalities	<ul style="list-style-type: none"> How do you solve an absolute value inequality? 	I	<ul style="list-style-type: none"> Solve inequalities involving absolute values Graph the solutions of absolute value inequalities 	<ul style="list-style-type: none"> Solve and graph the solution for an absolute value inequality 	Jan	<ul style="list-style-type: none"> Packet
	Real World applications	How can inequalities be used to increase the range of solutions?	I	<ul style="list-style-type: none"> Solve linear programming problems Solve practical problems involving linear inequalities 	<ul style="list-style-type: none"> Use linear inequalities to solve real world problems 	Jan	<ul style="list-style-type: none"> Packet Project
MIDTERM		<ul style="list-style-type: none"> 		<ul style="list-style-type: none"> 			<ul style="list-style-type: none">

PROBABILITY	Simple events	<ul style="list-style-type: none"> What is probability & what does it tell you? 	R M	Find probability of simple events	Find probability of an event with 1 outcome	Feb	<ul style="list-style-type: none"> Class lab Packet
	Odds	<ul style="list-style-type: none"> What is the difference between probability & odds? 	I	Find the odds of an event occurring	Find odds of an event with 1 outcome	Feb	<ul style="list-style-type: none"> Packet Quiz Project
	Counting Rule	<ul style="list-style-type: none"> How does the counting rule help to find the number of possible outcomes 	R M	<ul style="list-style-type: none"> Use counting rule of probability 	<ul style="list-style-type: none"> Use counting rule to find the number of possible events 	Feb	<ul style="list-style-type: none"> Packet
	Tree diagrams and charts	<ul style="list-style-type: none"> What are the different ways to show outcomes for an event? 	R M	<ul style="list-style-type: none"> Construct a tree diagram for 2 or 3 independent events Construct table to show outcomes for 2 independent events 	<ul style="list-style-type: none"> Draw tree diagrams Draw tables of possible events 	Feb	<ul style="list-style-type: none"> Packet Quiz
	Permutation & combination	<ul style="list-style-type: none"> What is permutation and combination? 	R M	<ul style="list-style-type: none"> Find factorials $x!$ Find permutations ${}_nP_r$ Find combinations ${}_nC_r$ 	<ul style="list-style-type: none"> Find factorials, permutations and combinations 	Feb	<ul style="list-style-type: none"> Packet Project
	Compound events	<ul style="list-style-type: none"> How do you find the probability of a compound event? 	R M	<ul style="list-style-type: none"> Find the probability of compound events 	<ul style="list-style-type: none"> Find probability of a compound event 	Feb	<ul style="list-style-type: none"> Packet
	Bernoulli experiment with 2 outcomes	<ul style="list-style-type: none"> How do you use combinations to find probabilities with 2 outcomes? 	I	<ul style="list-style-type: none"> Use Bernoulli rule with combinations to find binomial probabilities 	Use calculator to find binomial probabilities	Feb	<ul style="list-style-type: none"> Class lab
	Real World applications	<ul style="list-style-type: none"> How does probability help people on their job? 	I	<ul style="list-style-type: none"> Observe and predict the chances of a event occurring 	Apply probability to real world problems	Feb	<ul style="list-style-type: none"> Packet Project

STATISTICS	Central Tendency	<ul style="list-style-type: none"> • What do the measures of central tendency show us? • 	R M	<ul style="list-style-type: none"> • Calculate mean, mode, median • Explain the differences of mean, mode and median • 	<ul style="list-style-type: none"> • Calculate mean, mode and median • 	Feb	<ul style="list-style-type: none"> • Packet 	
		<ul style="list-style-type: none"> • Do the median, mean and mode values tell us the same thing? • 		<ul style="list-style-type: none"> • Discuss whether it makes a difference which central tendency value you use in a presentation 	<ul style="list-style-type: none"> • Discuss differences in each value of central tendency 	Feb	<ul style="list-style-type: none"> • Packet 	
	Statistical Graphs	<ul style="list-style-type: none"> • How can we present data? 	R M	<ul style="list-style-type: none"> • Construct frequency tables • Construct histogram/bar graph • Construct box & whisker graph • 	<ul style="list-style-type: none"> • Present data in various charts • 	Mar	<ul style="list-style-type: none"> • Packet 	
		<ul style="list-style-type: none"> • Are some graphs easier to interpret than others? 		<ul style="list-style-type: none"> • Interpret given graphs/charts 	<ul style="list-style-type: none"> • Extrapolate data from charts 	Mar	<ul style="list-style-type: none"> • Packet 	
	Range of Data	<ul style="list-style-type: none"> • Is it important to know the range of data values? • Is it important to know standard deviation of individual data? • 	I	<ul style="list-style-type: none"> • Calculate the range of data • Calculate standard deviation <p>Interpret what standard deviation tells us in reference to central tendencies</p>	<ul style="list-style-type: none"> • Explain how standard deviation is used with central tendencies 	Mar	<ul style="list-style-type: none"> • Packet 	
	Normal Distribution	<ul style="list-style-type: none"> • How do you draw and label a normal curve for a set of data? 	I	<ul style="list-style-type: none"> • Sketch a distribution curve using mean and standard deviation <p>Use percentages associated with a distribution curve</p>	<ul style="list-style-type: none"> • Interpret a distribution curve 	Mar	<ul style="list-style-type: none"> • Class lab 	
								Re Eq

	Real World Applications	<ul style="list-style-type: none"> Who uses statistics? Can we use known statistics to forecast data? 	I	<ul style="list-style-type: none"> Apply statistical techniques to real world problems Search skills on Career Zone 	<ul style="list-style-type: none"> Utilize statistics to compare data and forecast results 	Mar	<ul style="list-style-type: none"> Class lab
TRIGONOMETRY	Pythagoras	<ul style="list-style-type: none"> What is the Pythagorean Theorem? 	R M	<ul style="list-style-type: none"> Label hypotenuse and legs Use $a^2 + b^2 = c^2$ to solve for sides of a right triangle 	<ul style="list-style-type: none"> Apply $a^2 + b^2 = c^2$ 	Mar	<ul style="list-style-type: none"> Packet
	Special right triangles	How do you find the side of a 30:60:90 or 45:45:90 triangles without using Pythagoras?	R M	<ul style="list-style-type: none"> Apply 30:60:90 and 45:45:90 proportion to find sides of the special triangles Apply 3:4:5 and other Pythagorean triplets to right triangle situations 	<ul style="list-style-type: none"> Use 1:•3 : 2 and 1 : 1: • 2 Use 3:4:5 	Mar	<ul style="list-style-type: none"> Packet
	Right triangle trig	<ul style="list-style-type: none"> Can you find a side of a right triangle if you know a side and acute angle? 	R M	<ul style="list-style-type: none"> Apply soh cah toa to solve right triangle problems 	<ul style="list-style-type: none"> Use soh cah toa 	Mar	<ul style="list-style-type: none"> Packet
		How do you find an acute angle of a right triangle?		<ul style="list-style-type: none"> Use inverse sin, cos, tan to find angles Convert from DD to DMS 	Use soh cah toa	Apr	<ul style="list-style-type: none"> Packet
	Law of Sines	<ul style="list-style-type: none"> When do we need to use the Law of Sines in place of SOHCAHTOA 	I	<ul style="list-style-type: none"> Set up proportions following Law of Sines Identify triangles where Law of Sines is necessary for finding missing angles or sides 	Calculate sides and angles using law of Sines	Apr	<ul style="list-style-type: none"> Packet
	Law of Cosines	<ul style="list-style-type: none"> When do we need to use the Law of Cosines in place of SOHCAHTOA 	I	<ul style="list-style-type: none"> Set up equations using Law of Cosines Identify triangles where Law of Cosines is necessary for finding missing angles or sides 	<ul style="list-style-type: none"> Calculate sides and angles using law of Cosines 	Apr	<ul style="list-style-type: none"> Packet

	Area of Triangles using Trig formula	<ul style="list-style-type: none"> Can we find area of triangles without knowing height? 	I	<ul style="list-style-type: none"> Find area of triangles using $k=1/2 ab\sin C$ 	<ul style="list-style-type: none"> Calculate area, sides, or angles using area formula 	Apr	<ul style="list-style-type: none"> Packet
	Real world applications	How can you use characteristics of the right triangle to solve problems?	I	<ul style="list-style-type: none"> Use tangent to find slope of a line Use right triangle techniques to solve for sides and angles of real world problems 	Find sides and angles in right triangles	Apr	<ul style="list-style-type: none"> Project
FINANCIAL MATH	Income	<ul style="list-style-type: none"> How do we prepare for a job interview? How do compute gross pay and net income? What are standard deductions? 		<ul style="list-style-type: none"> Calculate gross pay with and without overtime. Calculate net income with standard tax, health care, etc. deductions. 	<ul style="list-style-type: none"> Use percentages accurately. 	May	<ul style="list-style-type: none"> Worksheets Quiz
	Banking	<ul style="list-style-type: none"> What are the different types of accounts? What is interest and how does it affect our money? Why should we save money? 		<ul style="list-style-type: none"> Calculate interest at different rates using compound interest formula. Compare different ways to save money. Compare/contrast accounts with interest and fees. Balancing checking accounts. 	<ul style="list-style-type: none"> Use compound interest formula Use basic operations and percents 	May	<ul style="list-style-type: none"> Banking lab
	Credit/Loans	<ul style="list-style-type: none"> What are the main types of credit? What do we need to consider before applying for credit? How does your credit affect a loan? 		<ul style="list-style-type: none"> Learn how to get credit for the first time Determine how long it takes to pay off a certain credit card balance if a fixed payment is made each month using graphing calculator Calculate monthly payment, total payments, and finance charges 	<ul style="list-style-type: none"> Use compound interest formula Use basic operations and percents 	May	<ul style="list-style-type: none"> Worksheets Quiz
	Housing	<ul style="list-style-type: none"> What are the advantages of renting vs. owning? What is safe debt load? 		<ul style="list-style-type: none"> Compare/contrast cost of renting vs. cost of owning Calculate safe debt load using income information Compute cost of living based on 	<ul style="list-style-type: none"> Use compound interest formula Use basic operations and percents 	May	<ul style="list-style-type: none"> Worksheets Quiz Project

		<ul style="list-style-type: none"> • What are your rights as a tenant? • What are the major costs of living on your own? 		given salary in different regions			
	Insurance	<ul style="list-style-type: none"> • What are the different types of insurance? • How does an insurance company calculate your rates? 		<ul style="list-style-type: none"> • Know the different coverage for homeowner's and renter's insurance and how to choose a policy based on individual needs • Calculate the payoff for a homeowner's insurance loss based on coverage • Understand the differences in automobile coverage and know how to choose a the right coverage to best protect themselves in an accident 	<ul style="list-style-type: none"> • Use basic operations and percents • Calculate using statistics 	May/June	<ul style="list-style-type: none"> • Worksheet • Quiz
	Budget	<ul style="list-style-type: none"> • What is a budget? • How do we determine the setup of our budget? • What is comparative shopping? • How does advertising affect what we buy? 		<ul style="list-style-type: none"> • Develop a budget using given scenarios • Evaluate and make adjustments to a given budget • Use unit pricing to increase purchasing power 	<ul style="list-style-type: none"> • Use basic operations and percents 	June	<ul style="list-style-type: none"> • Worksheet • Quiz • Project
FINAL PROJECT		<ul style="list-style-type: none"> • How can you present your budget to others 		Develop a PowerPoint presentation to share your budget with others	<ul style="list-style-type: none"> • Create a PowerPoint presentation 	June	<ul style="list-style-type: none"> • Project

COURSE: Probability & Statistics
GRADE LEVEL: 12th Grade

MAIN/GENERAL TOPIC:	SUB-TOPIC:	ESSENTIAL QUESTIONS:	WHAT THE STUDENT WILL KNOW OR BE ABLE TO DO:	SKILLS:	WHEN STUDENT DOES IT:	ASSESSMENTS:
PROBABILITY	BASIC TERMINOLOGY AND RULES	<ul style="list-style-type: none"> • CAN WE IDENTIFY EMPIRICAL VS. CLASSICAL PROBABILITIES • HOW DO YOU FIND THE PROBABILITY OF THE COMPLEMENT? • HOW DO WE USE AND/OR STATEMENTS IN FINDING PROBABILITIES? 	<ul style="list-style-type: none"> • BE ABLE TO CONDUCT EXPERIMENTS USING DICE, CARDS, AND THUMB TACKS • DISCUSS THE 'LET'S MAKE A DEAL' GAME 	<ul style="list-style-type: none"> • DO EXPERIMENTS IN CLASS 	SEPTEMBER	<ul style="list-style-type: none"> • REPORT RESULTS INDIVIDUALLY AND AS A CLASS • GRADED HOMEWORK PROJECT
	ODDS AND GAMES	<ul style="list-style-type: none"> • HOW DO WE FIND ODDS FOR AND ODDS AGAINST CERTAIN EVENTS? • HOW DO WE PLACE SINGLE AND DOUBLE ODDS IN THE GAME OF CRAPS? 	<ul style="list-style-type: none"> • BE ABLE TO USE PROBABILITIES TO FIND ODDS • BE ABLE TO PLAY SEVERAL DIFFERENT GAMES, INCLUDING CASINO GAMES, USING PROBABILITIES TO FIND FINANCIAL OUTCOMES 	<ul style="list-style-type: none"> • LEARN HOW TO FIND WINNINGS GIVEN CERTAIN ODDS • LEARN HOW TO BET AND HOW TO PLACE ODDS ON BOTH LINES 		<ul style="list-style-type: none"> • TAKE QUIZ AND BE ABLE TO PREDICT EARNINGS OR LOSSES
	CONDITIONAL PROBABILITIES	<ul style="list-style-type: none"> • HOW DO WE DECIDE WHETHER OR NOT EVENTS ARE DEPENDENT OR INDEPENDENT? • HOW DOES THIS DECISION AFFECT THE PROBABILITIES? 	<ul style="list-style-type: none"> • BE ABLE TO DETERMINE THE PROBABILITIES OF DEPENDENT AND INDEPENDENT EVENTS 	<ul style="list-style-type: none"> • LEARN HOW SOME PROBABILITIES AFFECT OTHERS AND SOME DO NOT 		<ul style="list-style-type: none"> • HOMEWORK CHECK • QUIZ
	Computer/ Calculator simulation of probabilities	<ul style="list-style-type: none"> • How can we use graphing calculator to generate data? 	<ul style="list-style-type: none"> • Be able to generate large quantities of data to perform experiments with probabilities 	<ul style="list-style-type: none"> • Learn how to use technology to get more accurate 		<ul style="list-style-type: none"> • Class experiment with gender selection and the Birthday

				information		Problem
	Permutations and Combinations	<ul style="list-style-type: none"> How do we determine if a problem is a permutation or a combination? 	<ul style="list-style-type: none"> Be able to find permutations and combinations on the calculator and the computer 	<ul style="list-style-type: none"> Determine the type of problem, nCr or nPr 	September	<ul style="list-style-type: none"> Daily homework check and quiz
	Applications of probability	<ul style="list-style-type: none"> How do we find probabilities of multiple changing events? How do we find probabilities for board games? 	<ul style="list-style-type: none"> Re-examine 'Let's make a deal' problem Prove the birthday problem Determine which high stakes lottery game has the best chances and determine how to increase those chances 	<ul style="list-style-type: none"> Find probability for multiple events with many scenarios 	October	<ul style="list-style-type: none"> Probability lottery project
CHS MATERIAL STARTS 2ND QUARTER		<ul style="list-style-type: none"> 	<ul style="list-style-type: none"> 	<ul style="list-style-type: none"> 		<ul style="list-style-type: none">
STATISTICS UNIT 1	Intro to Data and vocabulary	<ul style="list-style-type: none"> What do the terms data, statistics and population mean? What type of variables are measured? How can we organize data? How were they measured? Observational study or Experiment? Can we make a conclusion? Who collected and how was it collected? Is there a Bias? 	<ul style="list-style-type: none"> Recognize basic terms associated with statistics Make general observations about data Organize data in tables using frequency and relative frequency Understanding causality based on data collection 	<ul style="list-style-type: none"> Defining the terms Finding percentages Summarize data using percentages Making conclusions based on type of study or experiment 	November	<ul style="list-style-type: none"> Graded homework, quiz, group project
	Frequency distributions	<ul style="list-style-type: none"> How do we set up a frequency table? What is the difference between frequency, relative frequency and 	<ul style="list-style-type: none"> Be able to find class limits, boundaries, marks and widths from frequency table Be able to convert a frequency table to a relative or cumulative frequency table 	<ul style="list-style-type: none"> Set up the frequency table Set up relative and cumulative 	November	<ul style="list-style-type: none"> graded homework, group project

		cumulative frequency?		frequency tables		
	Uses and Abuses	<ul style="list-style-type: none"> How can we identify abuses of statistics? 	<ul style="list-style-type: none"> Find examples and graphic illustrations leading to misleading impressions 	<ul style="list-style-type: none"> Find articles in newspapers & magazines 		<ul style="list-style-type: none"> Oral presentation
UNIT 2	Visualizing data	<ul style="list-style-type: none"> What information does a graph tell us? How can we construct dot plots, histograms and stem and leaf plots? 	<ul style="list-style-type: none"> Be able to construct frequency histograms, relative frequency histograms, stem and leaf plots, and dot plots 	<ul style="list-style-type: none"> Construct, read, and interpret the different types of graphs 	November	<ul style="list-style-type: none"> Quiz, graded homework project
	Summarizing Features of data from graphs	<ul style="list-style-type: none"> How can we estimate the center from a graph? What does the spread tell us? How does the shape of the graph 	<ul style="list-style-type: none"> Be able to describe graphs by center, spread and shape. Know how to determine left and right skewed distributions Determine unimodal, bimodal and multimodal and explain the meaning for the data. 	<ul style="list-style-type: none"> Interpret and summarize data from graphs 		<ul style="list-style-type: none"> Test
UNIT 3	Measures of Central Tendency and variation	<ul style="list-style-type: none"> How do we determine the correct measures to use? Can we use the formulas to find measures of central tendency and variation? Why is it important to summarize the data using the correct measures? 	<ul style="list-style-type: none"> Be able to find the sample mean, weighted mean, and sample standard deviation for symmetric data Be able to compute the median and IQR for skewed data Explain what the measures of center and variation tell us about the data Compare standard deviations to decide which data is more dispersed 	<ul style="list-style-type: none"> Use formulas to find the required means, standard deviations, medians and IQR 		<ul style="list-style-type: none"> Group work, graded HW, Quiz
	Empirical Rule and z-scores	<ul style="list-style-type: none"> What does the Empirical Rule tell us about a symmetric distribution? How do we compute z-scores? How can we use z-scores to decide if data is unusual? 	<ul style="list-style-type: none"> Compute first three standard deviations and tell what percent of data is within each Find z-scores using formula and explain its meaning 	<ul style="list-style-type: none"> Calculate values for a symmetric bell curve using mean and standard deviation Calculate z-scores 	December	<ul style="list-style-type: none"> Graded HW, Quiz, Group work

	Summaries for Skewed Distributions	<ul style="list-style-type: none"> Why is it important to use median and IQR for skewed data? How can we compare data using the measures calculated? 	<ul style="list-style-type: none"> Be able to compute median and IQR by hand and on calculator Interpret median and IQR in the context of the data given 	<ul style="list-style-type: none"> Calculate median, Q1, Q3, IQR 		<ul style="list-style-type: none"> Graded HW, Group work, Quiz
	Comparing data	<ul style="list-style-type: none"> How does shape determine the measures we use? What effect does an outlier have on data summary? 	<ul style="list-style-type: none"> Decide which measures are appropriate for the situation Write an explanation and summary comparing data 	<ul style="list-style-type: none"> Calculate appropriate measures by hand and with calculator 		<ul style="list-style-type: none"> Graded HW, Group work, Quiz
	Using Boxplots to summarize data	<ul style="list-style-type: none"> What is the five number summary? Why is it important to use axes and labels for boxplots? How can we use boxplots to compare data? How do outliers effect boxplots? 	<ul style="list-style-type: none"> Be able to find the five number summary by hand and on calculator Draw and label boxplots with appropriate scales including data with outliers Summarize data given a boxplot 	<ul style="list-style-type: none"> Calculate 5 number summary for boxplot Interpret boxplot 		<ul style="list-style-type: none"> Graded HW, Group work, Quiz, Test
	Computer	<ul style="list-style-type: none"> How can we use the program Google Sheets to find the measures of center and variation? 	<ul style="list-style-type: none"> Be able to use the computer to find the mean and standard deviation, with and without a frequency table 	<ul style="list-style-type: none"> Use Google Sheets to find all appropriate measures 		<ul style="list-style-type: none"> Lab and Partner Project
Unit 4	Regression Analysis	<ul style="list-style-type: none"> What information can we get from a scatter plot? How do we determine the difference between the explanatory and response variables? 	<ul style="list-style-type: none"> Be able to explain the difference between explanatory and response variables Sketch a scatter plot with appropriate scales 	<ul style="list-style-type: none"> Create a scatterplot using appropriate scales Use calc to create scatter 	December	<ul style="list-style-type: none"> Homework
		<ul style="list-style-type: none"> What are the three pieces we need to look for when analyzing scatter plots 	<ul style="list-style-type: none"> Interpret data using a scatter plot using trend(direction), shape(form) and strength 	<ul style="list-style-type: none"> Write interpretation for data 		<ul style="list-style-type: none"> Homework, quiz

		<ul style="list-style-type: none"> • What is the linear correlation coefficient? • How do we find the linear correlation coefficient? • How do we find the line of best fit? 	<ul style="list-style-type: none"> • Using a graphing calculator, find the linear correlation coefficient and linear regression equation • Determine if a linear regression equation is an appropriate predictor for the data • Interpret each part of the linear regression equation in terms of context 	<ul style="list-style-type: none"> • Use STAT on TI84 to find LCC and linear regression equation 		<ul style="list-style-type: none"> • Group in class assignment
		<ul style="list-style-type: none"> • Does the y-intercept make sense? • What values can we predict for? 	<ul style="list-style-type: none"> • Determine if the y-intercept given by the regression equation works in terms of context • Decide whether the value predicted is interpolation or extrapolation 	<ul style="list-style-type: none"> • Evaluate predicted values and decide if they are valid 		<ul style="list-style-type: none"> • Group project
		<ul style="list-style-type: none"> • How do outliers and influential points effect data? • How is the coefficient of determination used? 	<ul style="list-style-type: none"> • Determine if data has an outlier or influential point • Interpret the effect of an outlier to the linear regression equation • Find r^2 and explain its meaning 	<ul style="list-style-type: none"> • Use graphing calculator to find r^2 		<ul style="list-style-type: none"> • Homework, quiz, test
UNIT 5	Modeling Variation with probability	<ul style="list-style-type: none"> • How do we determine if events are mutually exclusive? 	<ul style="list-style-type: none"> • Using addition rule and rules for mutually exclusive, find probabilities 	<ul style="list-style-type: none"> • Use 2-way tables to find probabilities 	January	<ul style="list-style-type: none"> • Quick review
UNIT 6	Modeling random events: Normal and Binomial models	<ul style="list-style-type: none"> • How do we determine if variables are discrete or continuous? • How do the graphs of discrete and continuous data differ? 	<ul style="list-style-type: none"> • Determine if data is discrete or continuous and draw an appropriate graph 	<ul style="list-style-type: none"> • Sketch graphs of PDF 	January	<ul style="list-style-type: none"> • Homework
		<ul style="list-style-type: none"> • How do areas and probabilities relate in probability distribution functions? • How do we find probabilities in a uniform distribution? 	<ul style="list-style-type: none"> • Find probabilities of discrete probability distributions • Determine probabilities for uniform distributions 	<ul style="list-style-type: none"> • Use probability rules and area formula to find areas 		<ul style="list-style-type: none"> • Homework, group work

		<ul style="list-style-type: none"> • How does the normal model differ from uniform model? • How does the area under the normal curve relate to the probability? • Can we describe the differences between normal curves with different means and standard deviations 	<ul style="list-style-type: none"> • Write the correct notation and sketch the graph for a normal distribution using the mean and standard deviation of a data set using 3 standard deviations • Interpret and describe the differences between data sets using mean and standard deviations as references using center, spread, and height 	<ul style="list-style-type: none"> • Use mean and standard deviations to create normal curves 		<ul style="list-style-type: none"> • Homework, quiz
		<ul style="list-style-type: none"> • What do standard scores represent? • How do standard scores (z-scores) help us find probability 	<ul style="list-style-type: none"> • Using z-scores, find probabilities between 2 values, less than and greater than given values • Interpret the probabilities in context 	<ul style="list-style-type: none"> • Use graphing calc functions to find probabilities <ul style="list-style-type: none"> • normalcdf(LL,UL, m,sd) 		<ul style="list-style-type: none"> • Group project
		<ul style="list-style-type: none"> • What are percentiles? • How do we find z-scores from percentiles or given percentages? 	<ul style="list-style-type: none"> • Using percentages or percentiles, find the value 	<ul style="list-style-type: none"> • Use graphing calculator to find values • invnorm(% ,m ,sd) 		<ul style="list-style-type: none"> • Homework, quiz
		<ul style="list-style-type: none"> • Is the normal model appropriate? 	<ul style="list-style-type: none"> • Explain when it would and would not be appropriate to use a normal model 	<ul style="list-style-type: none"> • Draw a normal curve • Check for symmetry/skewness 		<ul style="list-style-type: none"> • in class assignment, test
MIDTERM EXAM						
UNIT 7	Survey sampling and inference	<ul style="list-style-type: none"> • What types of bias are there when collecting data? • How can we avoid bias? • How does simple random sampling help to avoid bias? 	<ul style="list-style-type: none"> • Explain the difference between sampling bias and measurement bias • Determine which bias may have occurred in given examples • Discuss the meaning of a simple random sample(SRS) 	<ul style="list-style-type: none"> • Determine bias types • Use calculator to simulate data for SRS 	February	<ul style="list-style-type: none"> • Homework

		<ul style="list-style-type: none"> Why do we need to use standard error of a sample proportion (CLT)? What conditions need to be met to know our sample is not biased? 	<ul style="list-style-type: none"> Apply the standard error formula for a sample proportion Check the 3 conditions for calculating an estimate for the population using a sample proportion 	<ul style="list-style-type: none"> Calculate the standard error with graphing calculator Calculate the estimated percentage 		<ul style="list-style-type: none"> Homework
		•	•	•		•
		<ul style="list-style-type: none"> What changes in the z-score formula when using a sample proportion to estimate the population proportion? 	<ul style="list-style-type: none"> Calculate the z-score using standard error Find the percentage associated with z-score in context Explain numbers in context 	<ul style="list-style-type: none"> Use calculator to find percentages and values 		<ul style="list-style-type: none"> Homework, quiz,
	Population proportion confidence intervals	<ul style="list-style-type: none"> What is a confidence level? How are confidence intervals explained? How do confidence intervals help us make inferences about populations? 	<ul style="list-style-type: none"> Find and interpret the sample proportion from context Use the appropriate z^* for the confidence level given Calculate and interpret the margin of error Calculate and interpret confidence interval in context 	<ul style="list-style-type: none"> Calculate sample proportion, standard error, margin of error and confidence interval 		<ul style="list-style-type: none"> Homework, group work, quiz
	Finding appropriate sample sizes	<ul style="list-style-type: none"> How do we calculate how big of a sample we would need to satisfy all conditions of our confidence level and error percentage? 	<ul style="list-style-type: none"> Given a maximum percentage of error and a given level of confidence, find an appropriate sample size to give correct inferences about a specific population parameter 	<ul style="list-style-type: none"> Use formula to calculate sample size 		<ul style="list-style-type: none"> Homework, Test
UNIT 8	Hypothesis Testing for population proportions	<ul style="list-style-type: none"> How do we determine Null and Alternative hypotheses? What is the significance level? 	<ul style="list-style-type: none"> Write the known population value and claim in terms of symbols H_0 and H_1 Choose the appropriate z^* from given significance level 	<ul style="list-style-type: none"> Calculate z^* Translate inequalities correctly 	March	<ul style="list-style-type: none"> Homework
		<ul style="list-style-type: none"> How do we calculate a test statistic? How does a hypothesis test make 	<ul style="list-style-type: none"> Use sample statistics to find the test statistic and p-value, and make conclusions about the null hypothesis Interpret the results both 	<ul style="list-style-type: none"> Calculate the test statistic and p-value by 		<ul style="list-style-type: none"> Homework, quiz

		inferences about a population?	graphically and in context	hand and with calculator		
		<ul style="list-style-type: none"> How do we apply hypothesis tests to make inferences about populations? 	<ul style="list-style-type: none"> Perform all steps of a hypothesis test using sample proportions and interpret the results in terms of given claims 	<ul style="list-style-type: none"> 		<ul style="list-style-type: none"> Homework, group project
	Type 1 and type 2 errors	<ul style="list-style-type: none"> How does the significance level relate to error? How can we reduce errors? 	<ul style="list-style-type: none"> Determine when a type 1 or 2 error has occurred and explain what the error would mean in context 	<ul style="list-style-type: none"> Describe a type 1 or 2 error 		<ul style="list-style-type: none"> Homework, Test
UNIT 9	Inferring population means	<ul style="list-style-type: none"> How does standard error differ for sample means? How do sample size, dispersion and confidence level effect the sampling distribution? 	<ul style="list-style-type: none"> Graph a sampling distribution of the sample means Compare and interpret graphs when changes in sample size, confidence level and sample standard deviation occur 	<ul style="list-style-type: none"> Calculate standard error for pop mean 	April	<ul style="list-style-type: none"> Homework, group work
	t-distribution	<ul style="list-style-type: none"> How does the t-distribution differ from the normal distribution? Why is the t-distribution used? What are degrees of freedom? 	<ul style="list-style-type: none"> Describe how sample size will effect a t^* Find and explain the t-test statistic 	<ul style="list-style-type: none"> Use calculator to find t^* Calculate t-stat by hand and with calculator 		<ul style="list-style-type: none"> Homework, group work
	Confidence intervals for population mean	<ul style="list-style-type: none"> How do we use confidence interval to make inferences about a population mean? 	<ul style="list-style-type: none"> Find and interpret confidence intervals in context 	<ul style="list-style-type: none"> Calculate confidence intervals by hand and with calculator 		<ul style="list-style-type: none"> Homework, quiz
	Hypothesis test for population means	<ul style="list-style-type: none"> What conclusions can we make from hypothesis tests about a population mean? 	<ul style="list-style-type: none"> Perform a hypothesis test using a t-distribution and make conclusion about the null hypothesis Interpret the conclusions in context 	<ul style="list-style-type: none"> Calculate standard error, t^*, t-statistic by hand and with calculator 		<ul style="list-style-type: none"> Homework, group work, test

CHS MAT 127 Final Exam		•	•	•		•
test comparing two parameters	Two Proportions	• How do we do a hypothesis test comparing two proportions?	• Be able to use procedure similar to z-test but different degrees of freedom	• Apply hyp. Test and evaluate	April	• Daily homework check and quiz
	Two Means	• How do we determine if two samples are dependent or independent? • How do we do a hypothesis comparing two means?	• Be able to test for the dependent and independent cases using t test for dependent case and two sample t test for independent case similar approach to z-test but different degrees of freedom	• Apply hyp. Test and evaluate	May	• Homework check and graded homework project
	Two Variances	• How do we do a hypothesis test comparing two variances?	• Be able to use F test procedure similar to z-test, but different degrees of freedom	• Use F table and find df for both num and denom		• Check homework and give quiz
UNIT 10	Chi-Square	• How do we use hypothesis testing with standard deviations and variances?	• Recall set up from proportions/means and apply to standard deviations/variances	• Set up using Chi-square formula		• Check on calculator and computer
CHI-SQUARE AND ANOVA	Samples with the Same Size	• How can we do an analysis of variances for samples of equal size?	• Be able to use significance testing for more than two samples when each sample has the same sample size	• Use F test stat using new formula for ANOVA		• Daily homework, quiz
	Samples with Different Sample Sizes	• How can we do analysis of variances for samples of unequal size?	• Be able to use significance testing for more than two samples when samples have different sample sizes	• Use step by step process of handout		• Worksheet with partner to be graded
MULTINOMIAL EXPERIMENTS	Contingency Tables	• How can we tell if one factor depends upon another?	• Be able to use contingency tables to test for independence	• Find expected values and apply formula	June	• Check conclusions/interpretations in daily work and quiz
FINAL PROJECT					June	
		•	•	•		•

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COURSE: Pre-Calculus
GRADE LEVEL: 12th Grade

MAIN/GENERAL TOPIC:	SUB-TOPIC:	ESSENTIAL QUESTIONS:	WHAT THE STUDENTS WILL KNOW OR BE ABLE TO DO:	SKILLS:	WHEN STUDENT DOES IT:	ASSESSMENTS:
ALGEBRA REVIEW AND FUNDAMENTALS (CHAPTER 1)	Real numbers	<ul style="list-style-type: none"> • What is bounded and unbounded interval notation on the real number line? 	<ul style="list-style-type: none"> • Describe real number open and closed inequalities and graphs of inequalities using interval notation • Convert between interval notation and graphs or inequality notation 	<ul style="list-style-type: none"> • Use of $[a,b]$ and (a, b) notation for closed and open real number interval 	Sept.	<ul style="list-style-type: none"> • Daily HW
	Properties	<ul style="list-style-type: none"> • Can you identify and use the properties of real numbers? • What is absolute value? 	<ul style="list-style-type: none"> • Identify a real number property and use it to evaluate a real number expression • Evaluate an expression involving absolute value 	<ul style="list-style-type: none"> • Apply commutative, associative, distributive, identity, inverse and equality properties to evaluate an expressions • Find the absolute value of an expression 		<ul style="list-style-type: none"> • Daily HW
	Exponents	<ul style="list-style-type: none"> • Can you apply properties of exponents to simplify algebraic expressions? 	<ul style="list-style-type: none"> • Apply rules of exponents to algebraic expressions 	<ul style="list-style-type: none"> • Simplify algebraic expressions with positive and negative exponents • Apply rules of exponents in the use of scientific notation 	Sept.	<ul style="list-style-type: none"> • Quiz #1
	Radicals and rational exponents	<ul style="list-style-type: none"> • How can you write a radical with an exponent? 	<ul style="list-style-type: none"> • Convert a radical expression to exponential notation • Simplify a radical expression by removing factors • Rationalize the denominator with a radical • Combine radicals 	<ul style="list-style-type: none"> • Simplify radicals & rational exponent expressions, including fractions • Apply the properties of radicals 		<ul style="list-style-type: none"> • Daily HW

Complex number review	<ul style="list-style-type: none"> • How do we write an imaginary number in simplest form? • How can we graph imaginary numbers on the coordinate plane? 	<ul style="list-style-type: none"> • Convert radicals to imaginary notation • Simplify powers of i • Review of graphing $x+yi$ in the coordinate plane 	<ul style="list-style-type: none"> • Simplify any imaginary numbers to $a + bi$ form • Graph vectors associated with imaginary #'s 		<ul style="list-style-type: none"> • Daily HW • Quiz #2
Polynomials	<ul style="list-style-type: none"> • Can you combine polynomials by addition, subtraction, and multiplication? 	<ul style="list-style-type: none"> • Find sum, difference or product of polynomial expressions 	<ul style="list-style-type: none"> • Add and subtract polynomials • Use FOIL, vertical form and distributive property to multiply polynomials 		<ul style="list-style-type: none"> • Daily HW
Factoring	<ul style="list-style-type: none"> • How do you factor polynomials? 	<ul style="list-style-type: none"> • Factor trinomials, perfect square trinomials, difference of squares, sum and difference of cubes and polynomials by grouping 	<ul style="list-style-type: none"> • Factor using GCF, reverse FOIL, special products and grouping and master product 		<ul style="list-style-type: none"> • Quiz #3
Rational Expressions	<ul style="list-style-type: none"> • Do you feel confident when asked to simplify or combine rational expressions? • What is a complex fraction? • How do you simplify it? 	<ul style="list-style-type: none"> • Reduce rational expressions using factoring • Perform 4 basic operations with rational expressions • Determine the domain of rational expressions • Reduce a complex fraction 	<ul style="list-style-type: none"> • Reduce rational expression to lowest terms • Express domain for a rational expression • Find sum, difference, product and quotient of rational expressions • Use x by LCD to reduce a complex fraction 	Sept.	<ul style="list-style-type: none"> • Test 1A algebra review
Solve linear equations and inequalities	<ul style="list-style-type: none"> • How is solving a linear equation similar to and different from solving a 	<ul style="list-style-type: none"> • Solve a linear equation, including one involving fractions • Solve a linear inequality, including 	<ul style="list-style-type: none"> • Use x by LCD to solve equations & inequalities 	Sept.	<ul style="list-style-type: none"> • Daily HW

		linear inequality?	those involving fractions and double inequalities	involving fractions <ul style="list-style-type: none"> Use properties of equations and numbers to solve equations and inequalities in 1 variable 		
	Absolute value equations and inequalities	<ul style="list-style-type: none"> How do you solve an absolute value equation or inequality? 	<ul style="list-style-type: none"> Solve an absolute value equation algebraically and graphically Find the eliminate extraneous solutions 	<ul style="list-style-type: none"> Solve absolute value equations by the sign or graph method Solve absolute value inequality by the inequality, sign or graph method 		<ul style="list-style-type: none"> Daily HW
	Quadratic equations	<ul style="list-style-type: none"> What is the difference between a linear and quadratic equation? What is the equation model for projectile motion? 	<ul style="list-style-type: none"> Solve a quadratic by factoring, graphing, square root, completing the square and the quadratic formula to find zeroes of the function Create a quadratic application model to solve real world quadratic problems 	<ul style="list-style-type: none"> Find the solution to a quadratic equation by 1 of 5 methods Find zeroes of a quadratic function 	Sept.	<ul style="list-style-type: none"> Daily HW Quadratic jigsaw
	Quadratic functions	<ul style="list-style-type: none"> How do you write a quadratic equation of a parabola in vertex form? How does vertex describe the transformation of a basic parabola? 	<ul style="list-style-type: none"> Find the axis of symmetry, concavity and vertex of a parabola in standard form Find the vertex, concavity, and axis of symmetry of a parabola in vertex form Change from standard to vertex form and vice versa Confirm the concavity, vertex and axis of a parabola on a grapher 	<ul style="list-style-type: none"> Use $x = -b/2a$ to find the axis of symmetry and then the vertex of a parabola Extract the vertex and axis from the vertex form of a parabola Use completing the square to change standard to vertex form of a parabola 	Sept.	<ul style="list-style-type: none"> Daily HW

	Radical equations and inequalities	<ul style="list-style-type: none"> • What do you do differently to solve a radical equation or inequality? 	<ul style="list-style-type: none"> • Solve a radical equation graphically and algebraically • Find and eliminate extraneous solutions • Solve a radical inequality graphically 	<ul style="list-style-type: none"> • Solve radical equations by the square or graph method • Solve a radical inequality graphically 	Sept.	<ul style="list-style-type: none"> • Quiz #4
	Coordinate geometry review	<ul style="list-style-type: none"> • Can you find the slope, midpoint and distance between 2 points? 	<ul style="list-style-type: none"> • Use formulas for distance, slope and midpoint 	<ul style="list-style-type: none"> • Find distance midpoint and slope between 2 point on a line 	Oct.	<ul style="list-style-type: none"> • Daily HW
	Linear equations	<ul style="list-style-type: none"> • How do you write the equation of a line? • Can you recognize parallel and perpendicular lines from their equations? 	<ul style="list-style-type: none"> • Write the equation of a line using standard, point slope and slope intercept formulas • Determine the equation of a line that is parallel or perpendicular • Graph a linear equation by hand or using a graphing calculator 	<ul style="list-style-type: none"> • Write equation of a line given 2 points • Write equations for lines that are parallel or perpendicular to a given line • Find x and y intercepts of a graph 	Oct.	<ul style="list-style-type: none"> • Daily HW
CONIC SECTIONS (CHAPTER 10)	Graphing conics	<ul style="list-style-type: none"> • Can you recognize & graph the conics? 	<ul style="list-style-type: none"> • Identify the basic 4 conics of circle, ellipse, parabola and hyperbola 	<ul style="list-style-type: none"> • Use CHELP 	Oct.	<ul style="list-style-type: none"> • Daily HW • Matching project
	Translations	<ul style="list-style-type: none"> • Can you graph conics with both vertical and horizontal shifts? 	<ul style="list-style-type: none"> • Determine the horizontal and vertical shift for the graphs of parabolas, circles, etc 	<ul style="list-style-type: none"> • Graph equation of the form $y=(2x-5)^2 +3$ • Graph equation of the form $y = (2x + 3)^2$ 	Oct.	<ul style="list-style-type: none"> • Daily HW
	Circle	<ul style="list-style-type: none"> • How do you graph a circle whose center is not the origin? 	<ul style="list-style-type: none"> • Find the center and radius of any circle from its equation and graph it • Use completing the square to find the center and radius of circle • Write the equation of a circle from its graph 	<ul style="list-style-type: none"> • Graph a circle from its equation • Write the equation of a circle in center-radius form 	Oct.	<ul style="list-style-type: none"> • Quiz #5

	Parabola	<ul style="list-style-type: none"> How do you graph a parabola with a focus, directrix and latus rectum? 	<ul style="list-style-type: none"> Find the focus, directrix and latus rectum and use them to graph a parabola 	<ul style="list-style-type: none"> Graph a parabola in focus – directrix form 	Oct.	<ul style="list-style-type: none"> Daily HW
	Ellipse	<ul style="list-style-type: none"> How do you graph an ellipse knowing its foci and eccentricity? 	<ul style="list-style-type: none"> Find center, foci, major and minor axes of an ellipse Find eccentricity of an ellipse 	<ul style="list-style-type: none"> Graph an ellipse using its center, foci and length of its major and minor axes Write equation of an ellipse from its graph characteristics 	Oct.	<ul style="list-style-type: none"> Quiz #6
	Hyperbola	<ul style="list-style-type: none"> What is the difference between the equations of an ellipse and hyperbola? How do you tell if a hyperbola has x or y intercepts? 	<ul style="list-style-type: none"> Find the center, intercepts and slant asymptotes of hyperbola and use them to graph it as well as state its equation Find the eccentricity of a hyperbola 	<ul style="list-style-type: none"> Graph a hyperbola using its center, intercepts and slant asymptotes Write the equation of a hyperbola 	Oct.	<ul style="list-style-type: none"> Graphing project
	Inverse Variation Hyperbola	<ul style="list-style-type: none"> How is a regular hyperbola different from an inverse variation hyperbola 	<ul style="list-style-type: none"> Graph an $xy = k$ hyperbola using its vertical and horizontal asymptotes Identify the difference between direct and inverse variation 	<ul style="list-style-type: none"> Graph $xy = k$ hyperbolas 	Oct.	<ul style="list-style-type: none"> Test 1B
FUNCTIONS & GRAPHS (CHAPTER 2)	Functions & relations	<ul style="list-style-type: none"> What is the difference between a function and a relation? Can you compare the 3 ways to represent a function? What do the 12 basic functions look like? 	<ul style="list-style-type: none"> Identify the domain (implied and relevant) and range of a function Use function notation Determine the independent and dependent variable of a function Identify the symmetry of a function's graph Use a graphing calculator to evaluate a function Identify the basic properties of the 12 basic functions, recognize their graph and match real world situations to their graphs 	<ul style="list-style-type: none"> Use function $f(x)$ notation Find domain and range (input & output) Identify the symmetry and concavity of a graph Apply VLT to determine if a graph of a relation is a function 	Nov.	<ul style="list-style-type: none"> Daily HW

				<ul style="list-style-type: none"> Identify the graphs of the 12 basic functions: identity, square, cube, reciprocal, square root, exponential, log, sine, cosine, absolute value, step, & logistic 		
	Graph solutions of functions	<ul style="list-style-type: none"> What are x-intercepts What is a zero of a function? How can you use intersection of graphs to solve a problem? 	<ul style="list-style-type: none"> Find a solution for $f(x) = 0$ by using x intercepts Use the intersections of systems of equations to solve a problem graphically 	<ul style="list-style-type: none"> Use a graph to solve an equation or system of equations Use a graphing calculator to approximate solutions 	Nov.	<ul style="list-style-type: none"> Daily HW Quiz #1
	Characteristics of function graphs	<ul style="list-style-type: none"> Can you recognize the graph of a real world situation? How do you describe the behavior of a function graph? What is a piecewise vs. a step function? How do you graph an absolute value? 	<ul style="list-style-type: none"> Describe the continuity of a function from its graph Determine if a function is constant, increasing or decreasing from its graph Determine the local max and min and end behavior of a function Graph an absolute value, piecewise or step function Describe function as odd or even 	<ul style="list-style-type: none"> Tell if a function is continuous or discontinuous; increasing, constant or decreasing; and odd, even or neither Construct a graph for piecewise, step or absolute value functions 	Nov.	<ul style="list-style-type: none"> Daily HW
TRANSFORMATIONS	Transformation of the graphs of functions	<ul style="list-style-type: none"> What is the difference between a rigid and non-rigid transformation? What is the difference between an inside and outside change? 	<ul style="list-style-type: none"> Determine how vertical and horizontal translations change the character of a function's equation Determine how reflections change in a function's equation Determine the stretch or shrink from a function's equation Write or decode an equation that involves 2 or more transformations 	<ul style="list-style-type: none"> Identify the translation from a function's basic equation Identify the stretch or shrink from a function's equation Graph a function with 2 or more 	Nov.	<ul style="list-style-type: none"> Daily HW Matching project

				transformations		
	Combination of functions	<ul style="list-style-type: none"> How do you combine functions arithmetically? 	<ul style="list-style-type: none"> Combine function arithmetically by +, -, x, or / Find a rule and its new domain for a function combination 	<ul style="list-style-type: none"> Define a new rule for an arithmetic combination of functions 	Nov.	<ul style="list-style-type: none"> Daily HW
	Composition of functions	<ul style="list-style-type: none"> How is composition of a function like a factory assembly line? 	<ul style="list-style-type: none"> Composition of functions Decompose a function 	<ul style="list-style-type: none"> Evaluate fog (x) Find a rule for f(g(x)) Decompose a function into f(g(x)) 	Nov.	<ul style="list-style-type: none"> Daily HW Quiz #2
	Inverse relations and functions	<ul style="list-style-type: none"> How do you find the inverse of a function algebraically and graphically? 	<ul style="list-style-type: none"> Determine if a function is invertible Find the inverse of a function Find the graph of the inverse of a function by reflection Explain and use the inverse composition rule of invertible functions 	<ul style="list-style-type: none"> Use HLT to find if a function has inverse Use algebra to find and confirm a function's inverse Use reflection over y=x to find a function's inverse graphically 	Oct.	<ul style="list-style-type: none"> Test 2
POLYNOMIAL FUNCTIONS (CHAPTER 3)	Cubic and quartic functions	<ul style="list-style-type: none"> What do cubic and quartic equations look like when graphed? 	<ul style="list-style-type: none"> Graph a cubic and quartic function on a grapher to find real zeroes, intercepts, local extrema and end behavior Determine whether real zeroes exist Approximate irrational zeroes 	<ul style="list-style-type: none"> Use TI84+ to graph a degree 3 or higher polynomial and describe its behavior 	Nov.	<ul style="list-style-type: none"> Daily HW Quiz #1
	Polynomial division	<ul style="list-style-type: none"> How do you do long division with polynomials? 	<ul style="list-style-type: none"> Perform long polynomial division with binomial and trinomial divisors Find remainders for a polynomial division 	<ul style="list-style-type: none"> Divide polynomials with and without remainders 		<ul style="list-style-type: none"> Daily HW
	Synthetic division	<ul style="list-style-type: none"> What is synthetic division? 	<ul style="list-style-type: none"> Use synthetic division to divide polynomials, find remainders and factors 	<ul style="list-style-type: none"> Divide a polynomial by a binomial 	Nov.	<ul style="list-style-type: none"> Daily HW Quiz #2

	Factor and Remainder theorems	<ul style="list-style-type: none"> • How do you use synthetic division to find factors? • How can you find remainders without dividing? 	<ul style="list-style-type: none"> • Use synthetic division to find factors and remainders for polynomials • Use remainder theorem to evaluate a function and find a remainder without dividing 	<ul style="list-style-type: none"> • Convert between division by a factor of $(x-k)$ and $r = f(k)$ • Use division and remainder theorem to find factors and remainders 		<ul style="list-style-type: none"> • Daily HW
	Real zeroes of a function	<ul style="list-style-type: none"> • Can you find the real zeroes of a function from the graph or equation of a polynomial function? 	<ul style="list-style-type: none"> • Find zeroes for a function and use them in graphing the function • Find zeroes of a function from its graph and use them to factor the function • Identify the zeroes of a function and their multiplicity 	<ul style="list-style-type: none"> • Determine real zeroes of a function from its equation and graph 	Nov/Dec	<ul style="list-style-type: none"> • Daily HW
RATIONAL FUNCTIONS	Rational functions	<ul style="list-style-type: none"> • What does the equation and graph of a rational function look like? 	<ul style="list-style-type: none"> • Find the domain of a rational function • Recognize a rational function's graph as a transformation of the reciprocal function 	<ul style="list-style-type: none"> • Identify the domain of a rational function 	Nov.	<ul style="list-style-type: none"> • Daily HW
	Asymptotes and intercepts	<ul style="list-style-type: none"> • Can you find all the asymptotes of a rational function? 	<ul style="list-style-type: none"> • Use the domain of a function to determine vertical asymptotes • Use the degree rules for a rational function to tell if it has horizontal or slant asymptotes • Find the horizontal and slant asymptotes of a rational function 	<ul style="list-style-type: none"> • From the function find the equations for all the asymptotes and intercepts of rational functions • Graph a function using asymptotes and intercepts 	Nov.	<ul style="list-style-type: none"> • Daily HW • Quiz #2
	End and intermediate behavior	<ul style="list-style-type: none"> • Can you find the limit of a rational function as "x" approaches infinity? 	<ul style="list-style-type: none"> • Use limit notation to describe the behavior of a function as its graph approaches infinity or an asymptote • Find the limit of a function by direct substitution OR by rationalizing the denominator or reducing the expression 	<ul style="list-style-type: none"> • Predict the end behavior of a rational function 	Nov.	<ul style="list-style-type: none"> • Test 3

EXPONENTIAL AND LOGARITHMIC FUNCTIONS (CHAPTER 4)	Power comparisons	<ul style="list-style-type: none"> What does the graph of a power function look like? 	<ul style="list-style-type: none"> Sketch power functions and compare and contrast their graphs 	<ul style="list-style-type: none"> Graph power functions of the form $y = k(x)^n$ 	Dec.	<ul style="list-style-type: none"> Daily HW
	Exponential functions	<ul style="list-style-type: none"> What does the graph of an exponential function look like? What is the difference between a power and exponential equation? 	<ul style="list-style-type: none"> Sketch exponential functions Identify the horizontal and vertical asymptotes of the exponential function 	<ul style="list-style-type: none"> Graph exponential functions of the form $y = a(b)^x$ 	Dec.	<ul style="list-style-type: none"> Daily HW
	Exponential function with base "e"	<ul style="list-style-type: none"> What is "e"? When do you use the number "e"? 	<ul style="list-style-type: none"> Identify situations where "e" should be used in a problem Use "e" as a base in an exponential function 	<ul style="list-style-type: none"> Graph exponential function involving the base "e" 	Dec.	<ul style="list-style-type: none"> Daily HW
	Growth and decay models	<ul style="list-style-type: none"> What is continuous growth or decay? 	<ul style="list-style-type: none"> Find equations for models of data with growth and decay Determine when e should be used as a base in growth and decay models 	<ul style="list-style-type: none"> Use algebra and TI84+ to find equations for growth and decay models 	Dec.	<ul style="list-style-type: none"> M&M growth and decay project
	Logarithm functions	<ul style="list-style-type: none"> Where did that exponent go? 	<ul style="list-style-type: none"> Convert between the exponential and logarithmic function equation Explain the inverse relationship between exponential and logarithmic functions 	<ul style="list-style-type: none"> Write equivalent equations in exponential and log form 	Dec.	<ul style="list-style-type: none"> Quiz #1 Elusive exponent project
	Log (common and natural) Function	<ul style="list-style-type: none"> Can you find logs and anti-logs (common and natural)? 	<ul style="list-style-type: none"> Find the log and antilog of a number with base 10 and base e Apply the change of base rule to find the log of number with any base 	<ul style="list-style-type: none"> Find the log and antilog of a number 	Dec.	<ul style="list-style-type: none"> Daily HW
	Log properties	<ul style="list-style-type: none"> How are the properties of logs similar to exponent properties? 	<ul style="list-style-type: none"> Break down log expressions into sums and differences Use logs to do arithmetic calculations with products, quotients, powers and roots 	<ul style="list-style-type: none"> Write equivalent log expressions using the log rules Evaluate arithmetic expressions with logs 	Dec.	<ul style="list-style-type: none"> Daily HW Quiz #2

	Solving log equations	<ul style="list-style-type: none"> How do you use logs to solve equations? 	<ul style="list-style-type: none"> Use logs to solve to solve equations where the exponent is a variable 	<ul style="list-style-type: none"> Use logs to find unknown bases, roots and powers 	Dec.	<ul style="list-style-type: none"> Daily HW Quiz #3
	Log equation applications	<ul style="list-style-type: none"> How was the Richter scale created? What is "e"? How is continuous growth and decay different? 	<ul style="list-style-type: none"> Use logs and the Richter scale formula to find magnitudes of earthquakes Find equations for models using "e" in growth & decay data Investigate other applications of logs in areas such as decibels, ph, solar system distances Identify logistic curve model for sets of data 	<ul style="list-style-type: none"> Find equations for growth and decay models and log models of real world data 	Dec.	<ul style="list-style-type: none"> Daily HW
	Interest and annuity financial models	<ul style="list-style-type: none"> How do bankers use exponential and log equations? 	<ul style="list-style-type: none"> Develop and apply equations with initial investment, principal, interest rate and compounding period using the exponential model Find values including compound interest with common & natural logs 	<ul style="list-style-type: none"> Find interest, rate, initial investment and principal for various banking situations 	Dec.	<ul style="list-style-type: none"> Test 4
MODELING	Rule of Four	<ul style="list-style-type: none"> What are the 4 ways to model a real world numerical problem mathematically? 	<ul style="list-style-type: none"> Use words, symbols, numbers and graphs to represent a function model of a real world problem Apply the Polya's 4 step problem solving approach 	<ul style="list-style-type: none"> Use numerical, algebraic and graphic models to analyze & develop a solution for real world problem 	Jan.	<ul style="list-style-type: none"> Daily HW Quiz #1
	Real world applications for linear models	<ul style="list-style-type: none"> Can you create a math model to solve that will solve a real world linear problem algebraically, numerically or graphically? 	<ul style="list-style-type: none"> Given a linear problem solve it by using the various methods to deal with a function according to the rule of 4 such as <ul style="list-style-type: none"> Profit Percentage Perimeter Distance Investment Mixture Breakeven points 	<ul style="list-style-type: none"> Use a function to model a variable in terms of another variable to solve a problem algebraically, numerically or graphically and make predictions in practical situations 	Jan.	<ul style="list-style-type: none"> Daily HW Quiz #2

MIDTERM EXAM

TRIGONOMETRIC FUNCTIONS OF REAL NUMBERS (CHAPTER 5)	Angle measure	<ul style="list-style-type: none"> • How do you use a radian to measure an angle? • What makes a nautical mile different? 	<ul style="list-style-type: none"> • Express locations on the unit circle as angle rotations in terms of degrees and radians • Change between degrees and radians • Given a radius and central angle find the length of an arc 	<ul style="list-style-type: none"> • Convert between degree and radian measure • Use $S = \theta R$ 	Feb.	<ul style="list-style-type: none"> • Paper plate activity Lab 1
	Basic Trig functions	<ul style="list-style-type: none"> • Can you find the 6 basic trig ratios given 2 sides of a right triangle? • Can you apply the 6 trig functions to "solve a tight triangle"? 	<ul style="list-style-type: none"> • Define the 6 basic trig functions • Apply 6 basic trig functions to solve right triangle problems • Use Pythagoras in right triangle problems 	<ul style="list-style-type: none"> • Apply principles of right triangle trig and Pythagoras to solve problems 	Feb.	<ul style="list-style-type: none"> • Daily HW
	Special Right Triangles	<ul style="list-style-type: none"> • Do you know the function values for 30°, 45°, and 60° angles 	<ul style="list-style-type: none"> • Find and apply functions values for 30, 45 and 60 degree angles to solve right triangle problems 	<ul style="list-style-type: none"> • Apply 30-60-90 and 45-45-90 triangle relationships to find function values 	Feb.	<ul style="list-style-type: none"> • Quiz #1
	16 Point Unit Circle	<ul style="list-style-type: none"> • How are the coordinates of a point on the unit circle related to the sine and cosine of the rotation on the circle? 	<ul style="list-style-type: none"> • Find the sine and cosine values of (x,y) coordinates • State the sin and cos of quadrantal angles by their (x,y) coordinates • State the sin, cos and tan values of the 16 points on the unit circle • Write a trig function n terms of a positive acute angle 	<ul style="list-style-type: none"> • $X = r \cos \theta$ (where $r=1$) • $Y = r \sin \theta$ (where $r = 1$) • $\tan = \sin/\cos$ • ASTC sign rule 	Feb.	<ul style="list-style-type: none"> • Paper Plate Activity Lab 2
	Trig extension to circular (real numbers) periodic functions	<ul style="list-style-type: none"> • How do you determine the trig values of an angle in real number radian mode? 	<ul style="list-style-type: none"> • Find sin, cos, and tan of angles in written in terms of π or real number radian mode • Find all 6 trig functions of an angle in degree or radian mode 	<ul style="list-style-type: none"> • Write sin, cos, tan, sec, csc, and cot of rotation position on a circle with any radius 	Feb.	<ul style="list-style-type: none"> • Quiz #2

	Sine and cosine graphs	<ul style="list-style-type: none"> What does the graph of the sine and cosine function look like? 	<ul style="list-style-type: none"> Graph $y = \sin x$ and $y = \cos x$ Tell the domain and range of the sin or cos function Tell the max and min, amplitude and period of the sin and cos curves in the form $y = a \sin bx$ and $y = a \cos bx$ 	<ul style="list-style-type: none"> Sketch graphs of sin and cos curves using intercepts, and max and min points Use TI84+ to graph trig functions 	Feb.	<ul style="list-style-type: none"> Daily HW
	Sinusoidal graphs	<ul style="list-style-type: none"> How do you write equations for waves that are transformations of sine and cosine? 	<ul style="list-style-type: none"> Write equations in the form of $y = a \sin(bx + c) + d$ and $y = a \cos(bx + c) + d$ Tell the amplitude, frequency, period, phase shift and vertical shift of a sinusoidal wave 	<ul style="list-style-type: none"> Find, graph and interpret sinusoidal trig equations 	Feb.	<ul style="list-style-type: none"> Quiz #3
	Tangent, secant, cosecant, and cotangent graphs	<ul style="list-style-type: none"> What trig graphs are discontinuous? 	<ul style="list-style-type: none"> Graph tan, cot, sec and csc functions Tell the period, domain, range, asymptotes, and zeroes of the 6 basic trig graphs Describe a trig graph as odd, even or neither Describe a trig graph as continuous or discontinuous 	<ul style="list-style-type: none"> Sketch graphs of tangent, cotangent, secant, cosecant with transformations 	Feb.	<ul style="list-style-type: none"> Daily HW
	Trig regression	<ul style="list-style-type: none"> Can you develop trig equations for real world examples of periodic functions that are sinusoidal? 	<ul style="list-style-type: none"> Find the equation for a periodic function using TI83+ given a model set of data 	<ul style="list-style-type: none"> Construct a sinusoidal model using time and find its equation 		<ul style="list-style-type: none"> Temperature project Test 5-6
ANALYTIC TRIGONOMETRY (CHAPTER 7)	Basic Trig Identities	<ul style="list-style-type: none"> What is an identity? How can you apply the quotient, reciprocal and Pythagorean identities in trig? 	<ul style="list-style-type: none"> Use the quotient, reciprocal, co-function and Pythagorean trig identities to simplify trig expressions Confirm if an trig equation is a trig identity 	<ul style="list-style-type: none"> Simplify trig expressions using identities Trig identity proofs 	March	<ul style="list-style-type: none"> Daily HW Quiz #1
	Sum and difference of angles trig identities	<ul style="list-style-type: none"> How can you use a sum and difference to evaluate a trig function of an angle? 	<ul style="list-style-type: none"> Use sum and difference to evaluate a trig function 	<ul style="list-style-type: none"> Find value of a trig function by sum or difference of angles 		<ul style="list-style-type: none"> Daily HW

	Double and half angle identities	<ul style="list-style-type: none"> How do you use double or half of an angle to find its trig value? 	<ul style="list-style-type: none"> Use double and half to evaluate a trig function Solve trig equations with multiple angles 	<ul style="list-style-type: none"> Find value of a trig function by double of half of angles Solve multiple angle trig equations 	March	<ul style="list-style-type: none"> Daily HW Quiz #2
	Inverse Trig functions	<ul style="list-style-type: none"> What do inverses of trig graphs look like? 	<ul style="list-style-type: none"> Graph arc sin, arc cos, and arc tan function graphs Find the angles whose sin, cos and tan values are given using \sin^{-1}, \cos^{-1} and \tan^{-1} Evaluate composite trig functions 	<ul style="list-style-type: none"> Use \sin^{-1}, \cos^{-1} and \tan^{-1} angles Composition of trig and inverse trig functions 	March	<ul style="list-style-type: none"> Daily HW Quiz #3
	Trig equations	<ul style="list-style-type: none"> How do you solve trig equations? 	<ul style="list-style-type: none"> Solve a one function trig equation Solve a two function trig equation Solve a quadratic trig equation Solve trig equations graphically 	<ul style="list-style-type: none"> Solve 1 and 2 function trig equations 	March	<ul style="list-style-type: none"> Daily HW Test 7
TRIGONOMETRIC FUNCTIONS OF ANGLES (CHAPTER 6)	Law of Sines	<ul style="list-style-type: none"> How can you find angles and distances in a non-right triangle? 	<ul style="list-style-type: none"> Use the law of sines to find missing lengths and angles in an oblique triangle 	<ul style="list-style-type: none"> Use law of sines 	April	<ul style="list-style-type: none"> Daily HW
	Ambiguous Case	<ul style="list-style-type: none"> Is it possible to have 2 triangles that solve a sine law problem? 	<ul style="list-style-type: none"> Use the laws of sines in the ASS triangle setup to solve for the missing side and all possible angles 	<ul style="list-style-type: none"> Use law of sines in ASS case 	April	<ul style="list-style-type: none"> Daily HW Quiz #1
	Law of Cosines	<ul style="list-style-type: none"> How do you find sides of an acute and obtuse triangle? 	<ul style="list-style-type: none"> Use the law of cosines to find missing sides and angles of an oblique triangle 	<ul style="list-style-type: none"> Use law of cosines 	April	<ul style="list-style-type: none"> Daily HW
	Trig Area of Triangle	<ul style="list-style-type: none"> How do you find the area of a triangle if you don't know the base and altitude? 	<ul style="list-style-type: none"> Use Heron's formula using 3 sides of a triangle Use $A = \frac{1}{2} ab \sin C$ 	<ul style="list-style-type: none"> Find area of triangle using trig sine formula or Hero formula 	April	<ul style="list-style-type: none"> Daily HW Quiz #2
	Vectors	<ul style="list-style-type: none"> What is a vector? How do you use vectors with trig to solve problems with magnitude and direction? 	<ul style="list-style-type: none"> Draw a vector and write it in component form Find the magnitude and direction of a vector 	<ul style="list-style-type: none"> Use vectors to solve problems with magnitude and direction 	April	<ul style="list-style-type: none"> Daily HW Test 6B

POLAR COORDINATES AND VECTORS (CHAPTER 8)	Polar Coordinates	<ul style="list-style-type: none"> Can you plot points in a nonrectangular grid? 	<ul style="list-style-type: none"> Plot points in a polar graph Find the polar coordinates of a point in rectangular form Find the rectangular coordinates of a point in polar form 	<ul style="list-style-type: none"> Plot a point in polar form Convert between polar and rectangular form of coordinates 	April	<ul style="list-style-type: none"> Daily HW
	Polar Graphs	<ul style="list-style-type: none"> Can you find equations that will graph circular or cylindrical symmetry? 	<ul style="list-style-type: none"> Graph polar equations of shapes with circular symmetry like circle, rose and limacon curves and the spiral of Archimedes 	<ul style="list-style-type: none"> Use polar mode to graph polar equations 	April	<ul style="list-style-type: none"> Daily HW Quiz #4
	Vectors	<ul style="list-style-type: none"> Can you sketch a vector in the coordinate plane? Can you perform algebraic operations with vectors? Can you use vectors to solve applications? 	<ul style="list-style-type: none"> Do sum and products of vectors Solve problems involving velocity and direction such as wind and force with vectors 	<ul style="list-style-type: none"> Use and read vector notation Perform operations with vectors on coordinate plane and algebraically 	April	<ul style="list-style-type: none"> Daily HW Test 8
SYSTEMS OF EQUATIONS & EQUALITIES (CHAPTER 9)	Substitution solution	<ul style="list-style-type: none"> How do you solve a system with substitution? 	<ul style="list-style-type: none"> Use substitution to solve a system of equations? 	<ul style="list-style-type: none"> Solve a system of equations by substitution 	May	<ul style="list-style-type: none"> Daily HW
	Elimination solution	<ul style="list-style-type: none"> When can you use elimination to solve a system of equations? 	<ul style="list-style-type: none"> Use addition/subtraction to solve a systems of equations 	<ul style="list-style-type: none"> Find a solution by elimination to a system 	May	<ul style="list-style-type: none"> Daily HW
	Graphic solution	<ul style="list-style-type: none"> What do you have to look for to solve a system of equations by graphing? 	<ul style="list-style-type: none"> Use graphing to find intersections to solve a system of equations 	<ul style="list-style-type: none"> Solve a system by graphing on the TI84+ 	May	<ul style="list-style-type: none"> Quiz #1
	Gaussian elimination	<ul style="list-style-type: none"> What is the Gaussian elimination method and how is it like the addition/subtraction method? 	<ul style="list-style-type: none"> Use elementary row operations on a matrix of coefficients to solve a system of equations 	<ul style="list-style-type: none"> Find a solution to a system by Gaussian elimination 	May	<ul style="list-style-type: none"> Daily HW

	Solve linear and nonlinear systems	<ul style="list-style-type: none"> How do you find a solution for a mixture of linear and nonlinear systems? 	<ul style="list-style-type: none"> Solve by graphing a linear and nonlinear system equations Use substitution to solve a linear-nonlinear system 	<ul style="list-style-type: none"> Use graphing or substitution to solve linear/nonlinear systems 	May	<ul style="list-style-type: none"> Daily HW
	Solve systems with 3 or more variables with Gaussian elimination	<ul style="list-style-type: none"> How do you solve a system with 3 variables? 	<ul style="list-style-type: none"> Use triangular form and substitution to solve a 3+ variable system Use Gaussian elimination to solve a system Use a system of 3 variables to find the curve of best fit for a parabola 	<ul style="list-style-type: none"> Solve for 3 variables with 3 equations 	May	<ul style="list-style-type: none"> Quiz #2
	Solving systems of inequalities	<ul style="list-style-type: none"> How do you solve an inequality system? 	<ul style="list-style-type: none"> Use graphing to solve a system of inequalities 	<ul style="list-style-type: none"> Solve a system of 2 inequalities 	May	<ul style="list-style-type: none"> Daily HW
	Linear programming	<ul style="list-style-type: none"> What is linear programming used for? 	<ul style="list-style-type: none"> Use linear programming to solve a system of 3+ inequalities 	<ul style="list-style-type: none"> Solve a system of 3+ inequalities 	May	<ul style="list-style-type: none"> Quiz #3
MATRIX ALGEBRA	Matrices	<ul style="list-style-type: none"> What is a matrix? What operations can you do with them? 	<ul style="list-style-type: none"> State the order of a matrix Add, subtract matrices Use a zero, identity and inverse matrix in addition 	<ul style="list-style-type: none"> State the order and add & subtract matrices 	May	<ul style="list-style-type: none"> Daily HW
	Matrix multiplication	<ul style="list-style-type: none"> How do you multiply matrices 	<ul style="list-style-type: none"> Multiply a matrix by a scale factor Multiply 2 matrices 	<ul style="list-style-type: none"> Scalar and matrix multiplication 	May	<ul style="list-style-type: none"> Daily HW Quiz #4
	Determinant	<ul style="list-style-type: none"> What is a determinant? 	<ul style="list-style-type: none"> Find the value of a square 2x2 matrix Use expansion by minors to evaluate a 3x3 matrix 	<ul style="list-style-type: none"> Find the determinant of a 2x2 and 3x3 matrix 	May	<ul style="list-style-type: none"> Daily HW
	Cramer's Rule	<ul style="list-style-type: none"> How can you solve a systems of equations with determinants? 	<ul style="list-style-type: none"> Use Cramer's rule to solve a system of 2 or 3 linear equations 	<ul style="list-style-type: none"> Apply Cramer's rule to systems of equations 	May	<ul style="list-style-type: none"> Daily HW
	Identity and inverse	<ul style="list-style-type: none"> How do you find the identity or inverse for multiplication for a matrix? 	<ul style="list-style-type: none"> Find the inverse of a square 2x2 and 3x3 matrix Confirm a matrix is an inverse of another Solve system of equations using the inverse matrix 	<ul style="list-style-type: none"> State and use the identity and inverse for multiply for a matrix 	May	<ul style="list-style-type: none"> Daily HW

	Matrices on the TI 83+	<ul style="list-style-type: none"> Can you do matrix algebra on a calculator? 	<ul style="list-style-type: none"> Enter and evaluate the determinant of a matrix Add, subtract and multiply matrices on a calculator Find the inverse of a matrix on a calculator 	<ul style="list-style-type: none"> Use TI84+ to do basic matrix algebra 	May	<ul style="list-style-type: none"> Daily HW
	Solve an equation using matrices	<ul style="list-style-type: none"> What is RREF and how can it solve a system of 3 + linear equations? 	<ul style="list-style-type: none"> Use an augmented matrix and reduced row echelon form (RREF) on the calculator to solve a system of 3 equations 	<ul style="list-style-type: none"> Use TI 84+ and RREF matrix algebra to solve systems 	May	<ul style="list-style-type: none"> Daily HW
	Triangular area with matrices	<ul style="list-style-type: none"> Can you find the area of a triangle using the coordinates of its vertices? 	<ul style="list-style-type: none"> Find the area of a triangle with a determinant 	<ul style="list-style-type: none"> Find the area of a triangle with a matrix 	May	<ul style="list-style-type: none"> Quiz #5 Test 9
SCRETE ALGEBRA CHAPTER 11)	Sequences and series	<ul style="list-style-type: none"> What is Fibonacci sequence and where do you find it in nature? What is the difference between the terms series and sequence? 	<ul style="list-style-type: none"> Recognize and extend the Fibonacci number sequence Find a number pattern in a sequence and use it to extend it 	<ul style="list-style-type: none"> Define and extend a sequence recursively 	May/June	<ul style="list-style-type: none"> Daily HW
	Arithmetic sequences	<ul style="list-style-type: none"> Can you recognize an arithmetic sequence? What is the difference between a finite and infinite series? 	<ul style="list-style-type: none"> Find the "Kth" term of an arithmetic sequence Write a formula for an arithmetic sequence Use and evaluate the Σ notation with sequence sums Find the sum of "n" terms of an arithmetic sequence 	<ul style="list-style-type: none"> Find a specific term and the sum of a finite arithmetic sequence 	June	<ul style="list-style-type: none"> Daily HW Quiz #1
	Geometric sequences	<ul style="list-style-type: none"> Can you recognize a geometric sequence? What function that we studied this year is a model of a geometric sequence? 	<ul style="list-style-type: none"> Find the "kth" term of a geometric sequence Write a formula for a geometric sequence Find the sum on "n" terms of a geometric sequence and an infinite geometric sequence 	<ul style="list-style-type: none"> Find a specific term and the sum of an infinite and finite geometric sequence 	June	<ul style="list-style-type: none"> Daily HW Quiz #2

	Binomial Expansion Theorem	<ul style="list-style-type: none"> • What is Pascal's triangle? 	<ul style="list-style-type: none"> • Use Pascal's triangle and/or combinations to write expanded form of and power of a binomial 	<ul style="list-style-type: none"> • Do a binomial expansion 	Jun	<ul style="list-style-type: none"> • Daily HW
	Math Induction	<ul style="list-style-type: none"> • What does the tower of Hanoi have to do with induction? • How can math induction prove the arithmetic sequence formula for the "K^{th}" term? 	<ul style="list-style-type: none"> • Use math induction to prove sum of sequence formulas hold for all integers 	<ul style="list-style-type: none"> • Do math induction proofs 	Jun	<ul style="list-style-type: none"> • Test 11
REGRESSION	Lines of Best Fit	<ul style="list-style-type: none"> • What is a scatter plot? • Can you find a regression line for a linear set of data? • Can you distinguish between data that is linear and nonlinear? 	<ul style="list-style-type: none"> • Create a scatter plot by hand or on a graphing calculator • Find the line of best fit for data by hand and by use of a grapher • Find and use the Pearson correlation coefficient by hand or by using a graphing calculator for linear data 	<ul style="list-style-type: none"> • Use linear data to make a scatter plot and find a linear equation that best represents the data • Use the Pearson correlation coefficient to analyze an equation 	Jun	<ul style="list-style-type: none"> • National Debt Regression Project
	Quadratic regression equations	<ul style="list-style-type: none"> • How do you find the best curve of fit for a set of data that appears to be quadratic model? 	<ul style="list-style-type: none"> • Find an equation for a scatter plot that is quadratic in nature on a graph 	<ul style="list-style-type: none"> • Use a TI84+ to find the equation for quadratic data 	Jun	<ul style="list-style-type: none"> • Area Maximization Project
	Polynomial regression	<ul style="list-style-type: none"> • Can you determine an equation to represent a set of data that appears to be a cubic or quartic function? 	<ul style="list-style-type: none"> • Find the equation for the curve of best fit for polynomial function from a model set of data 	<ul style="list-style-type: none"> • Use TI84+ to find cubic and quartic regression equations for model data sets 	Jun	<ul style="list-style-type: none"> • Quiz #1
	Log and exponent regression models	<ul style="list-style-type: none"> • Can you find a model equation for models of log and exponent data? 	<ul style="list-style-type: none"> • Graph a log function and identify its horizontal and vertical asymptotes • Use TI84+ to find a log or exponential function of model data 	<ul style="list-style-type: none"> • Find a formula that models log and exponential data sets • Graph a log 	Jun	<ul style="list-style-type: none"> • Regression Project

				function and tell it's asymptotes		
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FINAL EXAM						
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COURSE: Honors Calculus
GRADE LEVEL: 12

*Review
 *Introduce
 *Master

MAIN/GENERAL TOPIC:	SUB-TOPIC:	ESSENTIAL QUESTIONS:	*	WHAT THE STUDENTS WILL KNOW OR BE ABLE TO DO:	SKILLS:	WHEN STUDENT DOES IT:	ASSESSMENTS:
REVIEW OF FUNCTIONS	Graphs	<ul style="list-style-type: none"> Can you graph basic functions without a graphing calculator? Can you write the function's equation given its graph? 	R	<ul style="list-style-type: none"> Graph basic functions without a graphing calculator Write the equation for a function's graph 	<ul style="list-style-type: none"> Sketch basic functions accurately Be able to use function notation 	Sept. (1 week)	<ul style="list-style-type: none"> Homework Quiz
	Interval Notation	<ul style="list-style-type: none"> Can you describe an interval using set-builder notation and interval notation? 	R	<ul style="list-style-type: none"> Write an interval using set-builder notation and interval notation 	<ul style="list-style-type: none"> Be able to use and read interval notations accurately 		<ul style="list-style-type: none"> Worksheet
	Domain/ Range	<ul style="list-style-type: none"> What are the domain and range of any of the basic functions and of any graph? 	R	<ul style="list-style-type: none"> Write the domain and range of functions and graphs using interval notation 	<ul style="list-style-type: none"> Define domain and range 		<ul style="list-style-type: none"> Worksheet Quiz
	Piece-wise Functions	<ul style="list-style-type: none"> Can you graph a piece-wise function? Can you write a piece-wise function's equations given its graph? 	R	<ul style="list-style-type: none"> Graph a piece-wise function Write a piece-wise function's equations given its graph 	<ul style="list-style-type: none"> Be able to graph all types of functions Be able to write equations for graphs 		<ul style="list-style-type: none"> Worksheets

LIMITS AND CONTINUITY	Rate of Change	<ul style="list-style-type: none"> • What is meant by rate of change? • What is the difference between average rate of change and instantaneous rate of change? 	I M	<ul style="list-style-type: none"> • Calculate the average rate of change of an object during an interval of time 	<ul style="list-style-type: none"> • Calculate change in range divided by change in domain 	Sept./ Oct. 5 weeks for this unit	<ul style="list-style-type: none"> • Homework • Workbook containing sample AP exam-style questions
	Limit	<ul style="list-style-type: none"> • What is a limit? • How do we find limits graphically and from a table of values (data)? • How do we find limits analytically? • When do limits fail to exist? 	I M	<ul style="list-style-type: none"> • Define limit in your own words • State the limit of a function by observing the graph and by the table of values (data) • Calculate limits analytically – particularly the 0/0 case • Determine when limits do not exist • Read / write with the limit notation 	<ul style="list-style-type: none"> • Be able to factor 2nd and 3rd degree polynomials 		<ul style="list-style-type: none"> • Homework • Weekly review sheet with sample AP exam questions
	Properties of Limits	<ul style="list-style-type: none"> • What are the sum, difference, product, constant multiple, quotient, and power rules for limits? 	I M	<ul style="list-style-type: none"> • Apply the properties of limits 	<ul style="list-style-type: none"> • Be able to use substitution and factor polynomials 		<ul style="list-style-type: none"> • Homework • Workbook • Quiz
	One-sided & Two-sided Limits	<ul style="list-style-type: none"> • How are one-sided limits determined? • How are two-sided limits determined? 	I M	<ul style="list-style-type: none"> • Determine the right and left-hand limits graphically, numerically, and analytically • Determine two-sided limits using substitution when substitution equals a finite value and when it equals 0/0 	<ul style="list-style-type: none"> • Graph functions using a graphing calculator • Use TABLE feature on calculator 		<ul style="list-style-type: none"> • Homework
	Sandwich Theorem	<ul style="list-style-type: none"> • What is the Sandwich (Squeeze) Theorem? • When is it necessary to use this theorem? 	I M	<ul style="list-style-type: none"> • Determine limits using the Sandwich Theorem 	<ul style="list-style-type: none"> • Use substitution 		<ul style="list-style-type: none"> • Homework • Weekly Review Sheet

	Limits Involving Infinity	<ul style="list-style-type: none"> • What is a horizontal asymptote? • How are limits, as $x \rightarrow +/- \infty$, found graphically, numerically, and analytically? • What is a vertical asymptote? • How are vertical asymptotes found analytically and graphically? 	I M	<ul style="list-style-type: none"> • State the equations of horizontal and vertical asymptotes • Determine finite limits as $x \rightarrow +/- \infty$ • Determine infinite limits graphically • State the relationship between asymptotes, graphs, and limits 	<ul style="list-style-type: none"> • Compare degrees of numerator & denominator for HA • Set denominator = 0 for finding VA and use $x=c$ (constant) 		<ul style="list-style-type: none"> • Homework • Quiz • Workbook • Review and Test on 2.1-2.2
	Continuity	<ul style="list-style-type: none"> • Can you define continuity at a point and discontinuity at a point? • Can you find points of continuity & discontinuity? • Can a discontinuity be “removed”? • What is a continuous function? • What are the different types of discontinuity? • Are combinations and composites of continuous functions continuous? 	I M	<ul style="list-style-type: none"> • Define continuity/discontinuity at a point and on an interval • Find the point(s) of continuity and discontinuity of functions, including piece-wise defined functions • Name the different types of discontinuity and be able to sketch an example of each • Remove “removable” discontinuities • State the properties of continuous functions and composite of continuous functions 	<ul style="list-style-type: none"> • Know differences among discontinuities: point, jump, oscillating, infinite 		<ul style="list-style-type: none"> • Homework • Quiz • Workbook
	Intermediate Value Theorem	<ul style="list-style-type: none"> • What is the IVT for continuous functions? • What is a real-life example of the IVT? 	I M	<ul style="list-style-type: none"> • State the IVT 	<ul style="list-style-type: none"> • Apply IVT to real-life situation 		<ul style="list-style-type: none"> • Homework • Weekly Review Sheet
	Rates of Change and Tangent Lines	<ul style="list-style-type: none"> • What is the definition of a tangent line to a curve? • Can we find the slope of a curve at any point? 	I M	<ul style="list-style-type: none"> • Give the geometric proof for finding slope of a curve at any point • State the formal definition of slope of a curve at a point • Calculate the normal to a curve 	<ul style="list-style-type: none"> • Find the slope of a line given 2 points on the line 		<ul style="list-style-type: none"> • Homework

		<ul style="list-style-type: none"> • Can you calculate the slope of a curve at a point using the Limit (Delta) Process? • What is a “normal”? • How are average and instantaneous speeds of an object calculated? 	R I	<ul style="list-style-type: none"> • Calculate the slope of a curve at a point using the Limit (Delta) Process • Recognize and state the slope of a curve at a point by the limit definition • Calculate average and instantaneous speeds of an object 	<ul style="list-style-type: none"> • Use the Limit Process 		<ul style="list-style-type: none"> • Homework • Quiz • Review and Test on all of Chapter 2
DERIVATIVES	Derivative of a Function	<ul style="list-style-type: none"> • What is a derivative? • How is a derivative calculated from a function as an equation and as tabular data? • What does the graph of a derivative of a function look like? • Is there a symbol for the derivative of a function? • How do we find one-sided derivatives? 	I M	<ul style="list-style-type: none"> • Calculate the derivative of a function at any point • Estimate the derivative of a function at a point given tabular data • State the definition of the derivative of a function at any point and at a specific point • Recognize all the different notations for derivative • Sketch the graph of f from f' • Find a one-sided derivative of a function 	<ul style="list-style-type: none"> • Use the limit process and/or TABLE on a calculator to find derivatives for polynomials • Estimate what the graph of f' looks like from observing f and vice versa 	Oct./ Nov. 6 weeks for this unit	<ul style="list-style-type: none"> • Homework • Weekly Review Sheet • Quiz • Workbook
	Differentiability	<ul style="list-style-type: none"> • What does it mean for a function to be differentiable? • Can derivatives fail to exist? 	I M	<ul style="list-style-type: none"> • Find where a function is not differentiable using the terms: corner, cusps, discontinuities, vertical tangents • Define local linearity and its connection to derivatives 	<ul style="list-style-type: none"> • Differentiability implies continuity but the converse is not true 		<ul style="list-style-type: none"> • Homework • Quiz
		<ul style="list-style-type: none"> • What happens if we zoom in on a portion of a curve? • Can a graphing calculator find a derivative's value? 	I M	<ul style="list-style-type: none"> • Calculate the derivative of a function at a specific point on Home & Calculate Screens on the graphing calculator • State the theorem relating differentiability with continuity 	<ul style="list-style-type: none"> • State the theorem relating differentiability with continuity 		<ul style="list-style-type: none"> • Homework • Quiz

	Intermediate Value Theorem for Derivatives	<ul style="list-style-type: none"> • What is the IVT for derivatives? 	I M	<ul style="list-style-type: none"> • State the IVT for Derivatives 	<ul style="list-style-type: none"> • If a & b are any 2 points in an interval on which f is differentiable, the f' takes on every value between $f'(a)$ and $f'(b)$ 		<ul style="list-style-type: none"> • Homework • Quiz • Workbook
	Rules for Differentiation	<ul style="list-style-type: none"> • Is there an analytical method for finding the derivative of a function? • Is it possible to find the derivative of f'? • What is the meaning of higher order derivatives? 	I M	<ul style="list-style-type: none"> • Apply the rule for finding the derivative of a constant function • Apply the power, constant multiple, sum, difference, product, quotient rules • Find higher order derivatives 	<ul style="list-style-type: none"> • Use derivative rules for polynomial functions 		<ul style="list-style-type: none"> • Homework • Quiz
	Velocity and Other Rates of Change	<ul style="list-style-type: none"> • What is displacement of an object and how is it found? • What is the difference between speed & velocity? • How can we find acceleration of an object? • Can we use derivatives to solve other problems involving rates of change? 	I M	<ul style="list-style-type: none"> • Calculate the position of an object • Calculate the displacement of an object • Explain the difference between speed and velocity • Calculate the speed, velocity and acceleration of an object • Apply derivatives to analyze straight line motion problems • Apply derivatives to problems other than motion 	<ul style="list-style-type: none"> • Use substitution to find position • Use change in position to find displacement • Use displacement divided by travel time to find average velocity • Use derivative of position function with respect to time to find instantaneous velocity • Acceleration is the derivative of velocity with respect to time 		<ul style="list-style-type: none"> • Homework • Quiz • Motion Detector Lab • Workbook • Weekly Review Sheet

	Derivatives of Trigonometric Functions	<ul style="list-style-type: none"> • How can we find the derivatives of trig functions? • What mode should be used with the calculator when finding the derivative value of a trig. function? • Can we use derivative rules with trig. functions? 	I M	<ul style="list-style-type: none"> • State the derivatives of the six basic trig functions • Find the derivative of trig. functions using a calculator • Apply derivative rules with trig. functions 	<ul style="list-style-type: none"> • Be able to recite and to write derivatives of the 6 trig. functions • Use derivative rules for sum, difference, product, quotient with trig. functions 	Nov.	<ul style="list-style-type: none"> • Homework • Quiz • Review and Test on 3.1-3.5
	Chain Rule	<ul style="list-style-type: none"> • How can we find the derivative of a composite function? • Can the Chain Rule be used more than once? • Why do we use radians in Calculus instead of degrees? 	I M	<ul style="list-style-type: none"> • State the Chain Rule in words and in function notation • Apply repeated use of the Chain Rule • Explain why radians are preferred rather than degrees with derivatives 	<ul style="list-style-type: none"> • $(f \circ g)' = f'(g(x)) \cdot g'(x)$ 		<ul style="list-style-type: none"> • Homework • Weekly Review Sheet • Quiz
	Implicit Differentiation	<ul style="list-style-type: none"> • What do explicit and implicit mean? • How do we find the derivative or slope of an equation when y is not easily solved? • Can we find the slope of non-functions? • How do we find the derivative of differentiable functions with rational powers? 	I M	<ul style="list-style-type: none"> • State, in your own words, the meaning of explicitly and implicitly defined functions • Find the derivative of an equation using implicit differentiation • Find a 2nd derivative implicitly • Differentiate a function with rational powers 	<ul style="list-style-type: none"> • Know derivative rules for polynomial and trig. functions 		<ul style="list-style-type: none"> • Homework • Quiz • Workbook
	Derivatives of Inverse Trig. Functions	<ul style="list-style-type: none"> • How do we find the inverse of a function analytically, graphically, numerically? 	R I M	<ul style="list-style-type: none"> • Sketch the inverse of a trig function 	<ul style="list-style-type: none"> • Graph by switching domain and range values 		<ul style="list-style-type: none"> • Homework • Workbook • Quiz

		<ul style="list-style-type: none"> • Can we find the derivative of the inverse of a trig. function? 		<ul style="list-style-type: none"> • Differentiate Arc sin x and Arc tan x 	<ul style="list-style-type: none"> • Memorize rules for differentiating Arc sine and Arc tangent of a value 		<ul style="list-style-type: none"> • Homework • Workbook • Quiz
	Derivatives of Exponential & Logarithmic Functions	<ul style="list-style-type: none"> • How do we find the derivative of exponential and log functions? • Can you state the domain of f' 	I M	<ul style="list-style-type: none"> • Differentiate $y = e^x$, $y = a^x$, $y = \ln x$, and $y = \log_a x$ • State the domain of f' 	<ul style="list-style-type: none"> • Know Log Rules for Products, Quotients, Powers • Use derivative rules with exponential and log functions, including the Chain Rule 		<ul style="list-style-type: none"> • Quiz • Review and Test on 3.5-3.9
APPLICATIONS OF DERIVATIVES	Extreme Value of Functions	<ul style="list-style-type: none"> • What is an absolute extreme value of a function? • What is a relative extreme value of a function? • What is a critical point? • How can critical points and extreme values be found? 	I M	<ul style="list-style-type: none"> • Define and find critical points, absolute & relative extreme values of a function graphically and analytically 	<ul style="list-style-type: none"> • Know definitions and algebraic procedures for finding these critical values • Know difference between point and value, and between relative and absolute values 	Dec./ Jan. 6 weeks for this unit	<ul style="list-style-type: none"> • Homework • Quiz • Weekly Review Sheet
	Mean Value Theorem for Derivatives	<ul style="list-style-type: none"> • What is the MVT for derivatives? • What is a real-life application for MVT? • How can increasing and decreasing intervals be found? • How can we find the original function given its derivative? 	I M	<ul style="list-style-type: none"> • State the entire MVT for derivatives • Sketch a geometric representation of the MVT for derivatives • Give a physical application for the MVT • State the intervals of increasing/decreasing values of a function • Find the anti-derivative of a function in order to find the velocity and position functions of an object in motion 	<ul style="list-style-type: none"> • Be able to state the entire MVT, including the entire hypothesis 		<ul style="list-style-type: none"> • Homework • Quiz • Workbook

	Connecting f' and f'' with the Graph of f	<ul style="list-style-type: none"> • What can we learn about the behavior of functions from f' & f'' ? • How can relative extreme values be found analytically? • What are the 1st & 2nd Derivative Tests? • What is concavity? • What is inflection point? 	I M	<ul style="list-style-type: none"> • Apply the 1st & 2nd Derivative Tests for finding relative extreme values, intervals of increasing/ decreasing values, intervals of concavity, and points of inflection • Use complete sentences with calculus notations to justify extreme values, intervals of increasing/ decreasing values and of concavity, and points of inflection • Graph f using data from f' & f'' 	<ul style="list-style-type: none"> • Derivative rules • First and Second Derivative tests 		<ul style="list-style-type: none"> • Homework • Quiz
	Modeling and Optimization	<ul style="list-style-type: none"> • What could be some real-life situations to which derivatives could be applied? 	I M	<ul style="list-style-type: none"> • Solve application problems involving max/min values of business, industry, and math (areas, surface areas, volumes) 	<ul style="list-style-type: none"> • Use 1st & 2nd Derivative tests to determine optimum values 		<ul style="list-style-type: none"> • Homework • Quiz • Workbook
	Linearization and Differentials	<ul style="list-style-type: none"> • What is linearization and why is it important? • What is a differential? • Why are differentials important? • Where are differentials used? 	I M	<ul style="list-style-type: none"> • Estimate complicated functions with linearizations • Evaluate dy for the given values of x and dx 	<ul style="list-style-type: none"> • $L(x) = f(a) + f'(a)(x-a)$ • $Dy=f'(x)dx$ 		<ul style="list-style-type: none"> • Homework • Quiz • Workbook
	Related Rates	<ul style="list-style-type: none"> • How can we find how fast/slow an object is moving at a given moment when 2 or more variables are involved? • How do we solve related rate problems? 	I M	<ul style="list-style-type: none"> • State the Given, Find, Variable Equation, Related Rate Equation, substitutions, and find the solution for a related rate problem • Interpret the solution for a related rate problem in a complete sentence 	<ul style="list-style-type: none"> • Implicit Differentiation and Chain Rule 		<ul style="list-style-type: none"> • Homework • Weekly Review Sheet • Review & Test Ch. 4
MID-TERM REVIEW & EXAM	Mid-term exam						

THE DEFINITE INTEGRAL	Estimating with Finite Sums	<ul style="list-style-type: none"> • How can we calculate the area under the graph of a function? • What does the area under the graph of a velocity function mean? • Are there other real-life applications? 	I M	<ul style="list-style-type: none"> • Estimate the area under the graph of a non-negative continuous function using rectangle approximation methods • Use left, right, midpoint rectangle approximation methods and compare results when approximating areas under a curve • Estimate areas using left, right, midpoint rectangle approximation methods using tabular data • Explain the meaning of net accumulation of a rate of change in terms of real-life situations when estimating areas under graphs 	<ul style="list-style-type: none"> • Area of a rectangle = LW 	Feb./ Mar. 5 weeks for this unit	<ul style="list-style-type: none"> • Homework • Quiz • Workbook
	Definite Integrals	<ul style="list-style-type: none"> • What is the calculus notation for area under a curve? • What is a definite integral? • How does a calculator compute the value of a definite integral? 	I M	<ul style="list-style-type: none"> • Define: definite integral, integration, Riemann sum • Compute the value of a definite integral using a calculator's built-in functions • Compute the value of a definite integral analytically • Read and write the notation for a definite integral • Explain the relationship between the limit of a particular sum (Riemann sum) and a definite integral 	<ul style="list-style-type: none"> • Use "fnInt" on graphing calculator on Home Screen and Graph Screen 		<ul style="list-style-type: none"> • Homework • Workbook • Quiz
	Definite Integrals and Anti-Derivatives	<ul style="list-style-type: none"> • What are some of the properties of definite integrals? • How do we find the average value of a function? • What is the Mean Value Theorem for Integrals? 	I M	<ul style="list-style-type: none"> • State and apply the properties of definite integrals • State the formula for average value of a function • Calculate the average value of a function • Sketch a geometric interpretation of the Mean Value Theorem for Integrals 	<ul style="list-style-type: none"> • Average Value = $\frac{1}{(b-a)} \int f(x) dx$ 		<ul style="list-style-type: none"> • Homework • Quiz • Weekly Review Sheet

	Fundamental Theorem of Calculus	<ul style="list-style-type: none"> Is there a connection between Differential and Integral Calculus? What is the name given to the theorem that connects these 2 branches of Calculus? 	I M	<ul style="list-style-type: none"> State the two parts of the Fundamental Theorem of Calculus Explain, in your own words, the meaning of both parts of the FTC Find the anti-derivative of polynomial functions Apply the FTC (both parts) Calculate total area versus net area 	<ul style="list-style-type: none"> Be able to apply both parts of the FTC to various problems Know the Power Rule for anti-derivatives of polynomials 		<ul style="list-style-type: none"> Homework Quiz Workbook
	The Trapezoidal Rule	<ul style="list-style-type: none"> Is there another way of approximating the area under a curve besides using rectangles? 	I M	<ul style="list-style-type: none"> Show with a concrete example that the Trapezoidal Rule is the average of left and right Riemann sum approximations State and apply the Trapezoidal Rule for finding approximations of the definite integral represented graphically, analytically, and numerically 	<ul style="list-style-type: none"> Area of a trapezoid = $\frac{1}{2} h (b_1 + b_2)$ 		<ul style="list-style-type: none"> Homework Review and Test on Chapter 5
DIFFERENTIAL EQUATIONS & MATHEMATICAL MODELING	Slope Fields	<ul style="list-style-type: none"> What is a differential equation? How do we solve differential equations? What is a slope field? How is a slope field constructed? 	I M	<ul style="list-style-type: none"> Define differential equation and slope field Construct a slope field given an initial value and a differential equation Interpret slope fields as visualizations of differential equations 	<ul style="list-style-type: none"> Be able to calculate slopes by substituting into a differential equation. Sketch short tangent segments using these slopes 	March/ April 4 weeks	<ul style="list-style-type: none"> Homework Quiz Workbook
	Anti-derivatives	<ul style="list-style-type: none"> How do we find the anti-derivatives of polynomial, exponential, logarithmic, and trigonometric functions? What is an indefinite integral? What are the properties of indefinite integrals? 	I M	<ul style="list-style-type: none"> Define indefinite integral Find anti-derivatives of polynomial, exponential, log, and trig. functions Construct anti-derivatives using the Fundamental Theorem of Calculus Solve differential equations given an initial value Apply the properties of indefinite integrals 	<ul style="list-style-type: none"> Memorize rules for finding anti-derivatives 		<ul style="list-style-type: none"> Homework Quiz Weekly Review Sheet

	Integration by Substitution	<ul style="list-style-type: none"> • What other methods are needed to find an anti-derivative when the power rule alone is not sufficient? 	I M	<ul style="list-style-type: none"> • Determine when to use the substitution method • Apply the substitution method for finding anti-derivatives • Calculate u-limits 	<ul style="list-style-type: none"> • Use variable representation: let $u = \dots$ and $du = \dots$ 		<ul style="list-style-type: none"> • Homework • Workbook • Quiz
	Separation of Variables	<ul style="list-style-type: none"> • How do we find the anti-derivative of a function containing 2 variables? 	I M	<ul style="list-style-type: none"> • Solve differential equations using separation of variables 	<ul style="list-style-type: none"> • Know anti-derivative rules (i.e., how to integrate both sides of a differential equation), and log and exponential rules 		<ul style="list-style-type: none"> • Homework • Workbook • Quiz
	Exponential Growth and Decay	<ul style="list-style-type: none"> • What are some real-life applications to solving differential equations? 	I M	<ul style="list-style-type: none"> • State the Law of Exponential Change • Solve problems involving exponential growth and decay in a variety of applications 	<ul style="list-style-type: none"> • Know anti-derivative rules, and separation of variables method 		<ul style="list-style-type: none"> • Homework • Quiz • Review and Test on Ch. 6
APPLICATIONS ON DEFINITE INTEGRALS	Integral as Net Change	<ul style="list-style-type: none"> • Can the techniques used in studying particle motion be generalized to other kinds of rates? • What does this mean: “the integral of a rate gives the net change”? • How can we calculate total distance traveled given a velocity function? 	I M	<ul style="list-style-type: none"> • Interpret a velocity function by describing the motion of a particle on either a horizontal or vertical axis • Find the position of a particle given its displacement and initial position • Calculate net distance traveled • Calculate total distance traveled using the numerical integration calculator feature • Calculate total accumulation and net change of quantities (other than those involving distance and velocity) using the integral 	<ul style="list-style-type: none"> • Know anti-derivative rules 	April/ May 5 weeks for this unit	<ul style="list-style-type: none"> • Homework • Workbook • Quiz • Weekly Review Sheet
	Areas in the Plane	<ul style="list-style-type: none"> • Can we find the areas between curves? • 	I M	<ul style="list-style-type: none"> • Calculate the area between 2 curves with and without changing boundaries 	<ul style="list-style-type: none"> • Know anti-derivative rules 		<ul style="list-style-type: none"> • Homework • Workbook • Quiz

		<ul style="list-style-type: none"> Can we integrate with respect to y? 	I M	<ul style="list-style-type: none"> Calculate areas between 2 curves with respect to y 	<ul style="list-style-type: none"> Find the points of intersection of 2 curves 		<ul style="list-style-type: none"> Homework Workbook Quiz 	
	Volumes	<ul style="list-style-type: none"> Can we use integrals to find volumes of solids? What shapes should we use to "slice" solids in order to find volumes? 	I M	<ul style="list-style-type: none"> State the calculus definition for volume of a solid Calculate the volume of a solid by the disk and washer methods with respect to x and with respect to y Calculate the volume of a solid by other cross-section shapes 	<ul style="list-style-type: none"> $V = \int A(x)dx$ or $V = \int A(y)dy$ $V = \pi \int R^2 dx$ or $V = \pi \int R^2 dy$ $V = \pi \int (R^2 - r^2) dx$ or dy 		<ul style="list-style-type: none"> Homework Workbook Volume Lab Quiz Review and Test on 7.1-3 	
L'HOPITAL'S RULE AND RATES OF GROWTH	L'Hopital's Rule (optional)	<ul style="list-style-type: none"> How do we find the limits of indeterminate forms? 	I M	<ul style="list-style-type: none"> Use l'Hopital's Rule for finding limits of rational functions and limits of indeterminate forms $0/0$ and ∞/∞ 	<ul style="list-style-type: none"> $f'(a)/g'(a)$ 	1 day	<ul style="list-style-type: none"> 	
	Relative Rates of Growth (optional)	<ul style="list-style-type: none"> What functions grow the fastest and which grow the slowest? 	R	<ul style="list-style-type: none"> Compare the relative magnitudes of functions and their rates of change 	<ul style="list-style-type: none"> Be able to graph $y = e^x$, $y = x^a$, $y = a^x$, and $y = \ln x$ 	1 Day	<ul style="list-style-type: none"> 	
FINAL EXAM REVIEW AND FINAL EXAM								<ul style="list-style-type: none"> Homework Quiz

COURSE: AP Calculus AB**
GRADE LEVEL: 12th Grade

Reviewing Old Skills and Practicing New Skills
 Introducing New Skills
 Mastering Skills

MAIN/ GENERAL TOPIC	SUB-TOPIC:	ESSENTIAL QUESTIONS:	*	WHAT THE STUDENTS WILL KNOW OR BE ABLE TO DO:	SKILLS:	WHEN STUDENT DOES IT:	ASSESSMENT
LIMITS AND CONTINUITY	Rate of Change	<ul style="list-style-type: none"> • What is meant by rate of change? • What is the difference between average rate of change and instantaneous rate of change? 	I M	<ul style="list-style-type: none"> • Calculate the average rate of change of an object during an interval of time. 	<ul style="list-style-type: none"> • Calculate change in range divided by change in domain 	Sept. 4 weeks for this unit	Homework Workbook containing sample AP exam-style questions
	Limit	<ul style="list-style-type: none"> • What is a limit? • How do we find limits graphically and from a table of values (data)? • How do we find limits analytically? • When do limits fail to exist? 	I M	<ul style="list-style-type: none"> • Define limit in your own words. • State the limit of a function by observing the graph and by the table of values (data). • Calculate limits analytically – particularly the 0/0 case. • Determine when limits do not exist? • Read and write with the limit notation. 	<ul style="list-style-type: none"> • Be able to factor 2nd and 3rd degree polynomials. 	Sept.	Homework Weekly Review Sheet with sample AP exam questions
	Properties of Limits	<ul style="list-style-type: none"> • What are the sum, difference, product, constant multiple, quotient, and power rules for limits? 	I M	<ul style="list-style-type: none"> • Apply the properties of limits. 	<ul style="list-style-type: none"> • Be able to use substitution and factor polynomials. 	Sept.	Homework Workbook Quiz

	One-sided & Two-sided Limits	<ul style="list-style-type: none"> • How are one-sided limits determined? • How are two-sided limits determined? 	I M	<ul style="list-style-type: none"> • Determine the right and left-hand limits graphically, numerically, and analytically. • Determine two-sided limits using substitution when substitution equals a finite value or when equals 0/0. 	<ul style="list-style-type: none"> • Graph functions using a graphing calculator. • Use TABLE feature on calculator. 	Sept.	Homework
	Sandwich Theorem	<ul style="list-style-type: none"> • What is the Sandwich (Squeeze) Theorem? • When is it necessary to use this theorem? 	I M	<ul style="list-style-type: none"> • Determine limits using the Sandwich Theorem. 	<ul style="list-style-type: none"> • Use substitution. 	Sept.	Homework Weekly Review Sheet
	Limits Involving Infinity	<ul style="list-style-type: none"> • What is a horizontal asymptote? • How are limits, as $x \rightarrow +/\infty$, found graphically, numerically, and analytically? • What is a vertical asymptote? • How are vertical asymptotes found analytically and graphically? 	I M	<ul style="list-style-type: none"> • State the equations of horizontal and vertical asymptotes. • Determine finite limits as $x \rightarrow +/\infty$. • Determine infinite limits graphically. • State the relationship between asymptotes, graphs, and limits. 	<ul style="list-style-type: none"> • Compare degrees of numerator & denominator for HA. • Set denominator = 0 for finding VA and use $x = c$ (constant). 	Sept.	Homework Quiz Workbook Review and Test
	Continuity	<ul style="list-style-type: none"> • Define continuity at a point and discontinuity at a point? • Can you find points of 	I M	<ul style="list-style-type: none"> • Define continuity /discontinuity at a point and on an interval. • Find the point(s) of continuity / discontinuity of functions, 	<ul style="list-style-type: none"> • Know differences among discontinuities: point, jump, 	Sept.	Homework Quiz Workbook

		<p>continuity & discontinuity?</p> <ul style="list-style-type: none"> • Can a discontinuity be “removed”? • What is a continuous function? • What are the different types of discontinuity? • Are combinations and composites of continuous functions continuous? 		<p>including piece-wise defined functions.</p> <ul style="list-style-type: none"> • Name the different types of discontinuity and be able to sketch an example of each. • Remove “removable” discontinuities. 	<p>oscillating, infinite.</p> <ul style="list-style-type: none"> • State the properties of continuous functions and composite of continuous functions. 		
	Intermediate Value Theorem	<ul style="list-style-type: none"> • What is the IVT for continuous functions? • What is a real-life example of the IVT? 	I M	<ul style="list-style-type: none"> • State the IVT. 	<ul style="list-style-type: none"> • Apply IVT to real-life situation. 	Sept.	Homework Weekly Review Sheet
	Rates of Change And Tangent Lines	<ul style="list-style-type: none"> • What is the definition of a tangent line to a curve? • Can we find the slope of a curve at any point? • Can you calculate the slope of a curve at a point using the Limit (Delta) Process? • What is a “normal” ? • How are average and instantaneous speeds of an object calculated? 	I M	<ul style="list-style-type: none"> • Give the geometric proof for finding slope of a curve at any point. • State the formal definition of slope of a curve at a point. • Calculate the slope of a curve at a point using the Limit (Delta) Process. • Calculate the normal to a curve. • Recognize and state the slope of a curve at a point by the limit definition. • Calculate average and instantaneous speeds of an object. 	<ul style="list-style-type: none"> • Find the slope of a line given 2 points on the line. • Use the Limit Process. 	Oct.	Homework Quiz Review and Test on entire unit

DERIVATIVES	Derivative of a Function	<ul style="list-style-type: none"> • What is a derivative? • How is a derivative calculated from a function as an equation and as tabular data? • What does the graph of a derivative of a function look like? • Is there a symbol for the derivative of a function? • How do we find one-sided derivatives? 	I M	<ul style="list-style-type: none"> • Calculate the derivative of a function at any point. • Estimate the derivative of a function at a point given tabular data. • State the definition of the derivative of a function at any point and at a specific point. • Recognize all the different notations for derivative. • Sketch the graph of f' from f and the graph of f from f'. • Find a one-sided derivative of a function. 	<ul style="list-style-type: none"> • Use the limit process and/or TABLE on a calculator to find derivatives for polynomials. • Estimate what the graph of f' looks like from observing f and vice versa. 	Oct. 6 weeks for this unit.	Homework Weekly Review Sheet Quiz Workbook
	Differen-tiability	<ul style="list-style-type: none"> • What does it mean for a function to be differentiable? • Can derivatives fail to exist? • What happens if we zoom in on a portion of a curve? • Can a graphing calculator find a derivative's value? 	I M	<ul style="list-style-type: none"> • Find where a function is not differentiable using the terms: corner, cusps, discontinuities, vertical tangents. • Define local linearity and its connection to derivatives. • Calculate the derivative of a function at a specific point on Home & Calculate Screens on the graphing calculator. • State the theorem relating differentiability with continuity. 	<ul style="list-style-type: none"> • Differentiability implies continuity but the converse is not true. 	Oct.	Homework Quiz
	Interme-diate Value Theorem for Derivatives	<ul style="list-style-type: none"> • What is the IVT for derivatives? 	I M	<ul style="list-style-type: none"> • State the IVT for Derivatives. 	<ul style="list-style-type: none"> • If a & b are any two points in an interval on which f is differentiable, then f' takes on every value 	Oct.	Homework Quiz Workbook

					between $f'(a)$ and $f'(b)$.		
	Rules for Differentiation	<ul style="list-style-type: none"> • Is there an analytical method for finding the derivative of a function? • Is it possible to find the derivative of f''? • What is the meaning of higher order derivatives? 	I M	<ul style="list-style-type: none"> • Apply the rule for finding the derivative of a constant function. • Apply the power, constant multiple, sum, difference, product, quotient rules. • Find higher order derivatives. 	<ul style="list-style-type: none"> • Use derivative rules for polynomial functions. 	Oct.	Homework Quiz
	Velocity and Other Rates Of Change	<ul style="list-style-type: none"> • What is displacement of an object and how is it found? • What is the difference between speed & velocity? • How can we find acceleration of an object? • Can we use derivatives to solve other problems involving rates of change? 	I M	<ul style="list-style-type: none"> • Calculate the position of an object. • Calculate the displacement of an object. • Explain the difference between speed and velocity. • Calculate the speed, velocity and acceleration of an object. • Apply derivatives to analyze straight line motion problems. • Apply derivatives to problems other than motion. 	<ul style="list-style-type: none"> • Use substitution to find position. • Use change in position to find displacement. • Use displacement divided by travel time to find average velocity. • Use derivative of position function with respect to time to find instantaneous velocity. • Acceleration is the derivative of velocity with respect to time. 	Oct.	Homework Quiz Motion Detector Lab Workbook Weekly Review Sheet

	Derivatives of Trigonometric Functions	<ul style="list-style-type: none"> • How can we find the derivatives of trig functions? • What mode should be used with the calculator when finding the derivative value of a trig. function? • Can we use derivative rules with trig. functions? 	I M	<ul style="list-style-type: none"> • State the derivatives of the six basic trig functions. • Find the derivative of trig. functions using a calculator. • Apply derivative rules with trig. functions. 	<ul style="list-style-type: none"> • Be able to recite and to write derivatives of the 6 trig. functions. • Use derivative rules for sum, difference, product, quotient with trig. functions. 	Nov.	Homework Quiz Review and Test
	Chain Rule	<ul style="list-style-type: none"> • How can we find the derivative of a composite function? • Can the Chain Rule be used more than once? • Why do we use radians in Calculus instead of degrees? 	I M	<ul style="list-style-type: none"> • State the Chain Rule in words and in function notation. • Apply repeated use of the Chain Rule. • Explain why radians are preferred rather than degrees with derivatives. 	$(f \circ g)' = f'(g(x)) \cdot g'(x)$	Nov.	Homework Weekly Review Sheet Quiz
	Implicit Differentiation	<ul style="list-style-type: none"> • What do explicit and implicit mean? • How do we find the derivative or slope of an equation when y is not easily solved? • Can we find the slope of non-functions? • How do we find the derivative of differentiable functions with rational powers? 	I M	<ul style="list-style-type: none"> • State, in your own words, the meaning of explicitly and implicitly defined functions. • Find the derivative of an equation using implicit differentiation. • Find a 2nd derivative implicitly. • Differentiate a function with rational powers. 	<ul style="list-style-type: none"> • Know derivative rules for polynomial and trig. functions. 	Nov.	Homework Quiz Workbook

	Derivatives of Inverse Trig. Functions	<ul style="list-style-type: none"> • How do we find the inverse of a function analytically, graphically, numerically? • Can we find the derivative of the inverse of a trig. function? 	R I M	<ul style="list-style-type: none"> • Sketch the inverse of a trig function. • Differentiate Arc sin x and Arc tan x. 	<ul style="list-style-type: none"> • Graph interchanging domain and range. • Memorize rules for differentiating Arc sin x and Arc tan x. 	Nov.	Homework Workbook Quiz
	Derivatives of Exponential and Logarithmic Functions	<ul style="list-style-type: none"> • How do we find the derivative of exponential and log functions? • State the domain of f' 	I M	<ul style="list-style-type: none"> • Differentiate $y = e^x$, $y = a^x$, $y = \ln x$, and $y = \log_a x$. • State the domain of f'. 	<ul style="list-style-type: none"> • Know Log Rules for Products, Quotients, Powers. • Use derivative rules with exponential and log functions, including the Chain Rule. 	Nov.	Quiz Review and Test
APPLICATIONS OF DERIVATIVES	Extreme Value of Functions	<ul style="list-style-type: none"> • What is an absolute extreme value of a function? • What is a relative extreme value of a function? • What is a critical point? • How can critical points and extreme values be found? 	I M	<ul style="list-style-type: none"> • Define and find critical points, absolute & relative extreme values of a function graphically and analytically. 	<ul style="list-style-type: none"> • Know definitions and algebraic procedures for finding these critical values. • Know difference between point and value, and between relative and absolute values. 	Dec. Five weeks for this unit	Homework Quiz Weekly Review Sheet
	Mean Value Theorem for Derivatives	<ul style="list-style-type: none"> • What is the MVT for derivatives? • What is a real-life application for MVT? 	I M	<ul style="list-style-type: none"> • State the entire MVT for derivatives. • Sketch a geometric representation of the MVT for 	<ul style="list-style-type: none"> • Be able to state the entire MVT, including the entire hypothesis. 	Dec.	Homework Quiz

		<ul style="list-style-type: none"> • How can increasing and decreasing intervals be found? • How can we find the original function given its derivative? 		<ul style="list-style-type: none"> • derivatives. • Give a physical application for the MVT. • State the intervals of increasing/decreasing values of a function. • Find the anti-derivative of a function in order to find the velocity and position functions of an object in motion. 			Workbook
	Connecting f' and f'' with the Graph of f	<ul style="list-style-type: none"> • What can we learn about the behavior of functions from f' & f''? • How can relative extreme values be found analytically? • What are the 1st & 2nd Derivative Tests? • What is concavity? • What is inflection point? 	I M	<ul style="list-style-type: none"> • Apply the 1st & 2nd Derivative Tests for finding relative extreme values, intervals of increasing /decreasing values, intervals of concavity, and points of inflection. • Use complete sentences with calculus notations to justify extreme values, intervals of increasing /decreasing values and of concavity, and points of inflection. • Graph f using information from f' & f''. 	<ul style="list-style-type: none"> • Derivative rules • First and Second Derivative tests 	Dec.	Homework Quiz
	Modeling and Optimization	<ul style="list-style-type: none"> • What could be some real-life situations to which derivatives could be applied? 	I M	<ul style="list-style-type: none"> • Solve application problems involving max/min values of business, industry, and math (areas, surface areas, volumes). 	<ul style="list-style-type: none"> • Use 1st & 2nd Derivative tests to determine optimum values. 	Dec.	Homework Quiz Workbook

	Linearization and Differentials	<ul style="list-style-type: none"> • What is linearization and why is it important? • What is a differential? • Why are differentials important? • Where are differentials used? 	I M	<ul style="list-style-type: none"> • Estimate complicated functions with linearizations. • Evaluate dy for the given values of x and dx. 	<ul style="list-style-type: none"> • $L(x) = f(a) + f'(a)(x - a)$ • $dy = f'(x)dx$ 	Jan.	Homework Quiz Workbook
	Related Rates	<ul style="list-style-type: none"> • How can we find how fast/slow an object is moving at a given moment when 2 or more variables are involved? • How do we solve related rate problems? 	I M	<ul style="list-style-type: none"> • State the Given, Find, Variable Equation, Related Rate Equation, substitutions, and find the solution for a related rate problem. • Interpret the solution for a related rate problem in a complete sentence. 	<ul style="list-style-type: none"> • Implicit Differentiation and Chain Rule 	Jan.	Homework Weekly Review sheet Review & Test on unit.
MID-TERM REVIEW AND EXAM Mid-term exam is of same format and length as an AP exam.							
DEFINITE INTEGRAL	Estimating with Finite Sums	<ul style="list-style-type: none"> • How can we calculate the area under the graph of a function? • What does the area under the graph of a velocity function mean? • Are there other real-life applications? 	I M	<ul style="list-style-type: none"> • Estimate the area under the graph of a non-negative continuous function using rectangle approximation methods. • Use left, right, midpoint rectangle approximation methods and compare results when approximating areas under a curve. • Estimate areas using left, right, midpoint rectangle approximation methods using 	<ul style="list-style-type: none"> • Area of a rectangle = LW • Explain the meaning of net accumulation of a rate of change in terms of real-life situations when estimating areas under graphs. 	Feb. three weeks for this unit.	Homework Quiz Workbook

				tabular data.			
	Definite Integrals	<ul style="list-style-type: none"> • What is the calculus notation for area under a curve? • What is a definite integral? • How does a calculator compute the value of a definite integral? 	I M	<ul style="list-style-type: none"> • Define: definite integral, integration, Riemann sum. • Compute the value of a definite integral using a calculator's built-in functions. • Compute the value of a definite integral analytically. • Read and write the notation for a definite integral. • Explain the relationship between the limit of a particular sum (Riemann sum) and a definite integral. 	<ul style="list-style-type: none"> • Know how to use a calculator's built-in functions for definite integral, especially on Home Screen. 	Feb.	Homework Workbook Quiz
	Definite Integrals and Anti-derivatives	<ul style="list-style-type: none"> • What are some of the properties of definite integrals? • How do we find the average value of a function? • What is the Mean Value Theorem for Integrals? 	I M	<ul style="list-style-type: none"> • State and apply the properties of definite integrals. • State the formula for average value of a function. • Calculate the average value of a function. • Sketch a geometric interpretation of the Mean Value Theorem for Integrals. 	<ul style="list-style-type: none"> • Average Value = $\frac{1}{b-a} \int_a^b f(x) dx$ 	Feb.	Homework Quiz Weekly Review Sheet
	Fundamen-tal Theorem of Calculus	<ul style="list-style-type: none"> • Is there a connection between Differential and Integral Calculus? • What is the name given to the theorem that 	I M	<ul style="list-style-type: none"> • State the two parts of the Fundamental Theorem of Calculus. • Explain, in your own words, the meaning of both parts of the 	<ul style="list-style-type: none"> • Be able to apply both parts of the FTC to various problems. • Know the Power 	Feb.	Homework Quiz Workbook

		connects these 2 branches of Calculus?		<p>FTC.</p> <ul style="list-style-type: none"> Find the anti-derivative of polynomial functions. Apply both parts of FTC 	<p>Rule for anti-derivatives of polynomials.</p> <ul style="list-style-type: none"> Calculate total area versus net area. 		
	TheTrapezoidal Rule	<ul style="list-style-type: none"> Is there another way of approximating the area under a curve besides using rectangles? 	I M	<ul style="list-style-type: none"> Show with a concrete example that the Trapezoidal Rule is the average of left and right Riemann sum approximations. State and apply the Trapezoidal Rule for finding approximations of the definite integral represented graphically, analytically, and numerically. 	<ul style="list-style-type: none"> Area of a trapezoid = $\frac{1}{2} h (b_1 + b_2)$. 	Feb.	<p>Homework</p> <p>Review and Test on unit</p>
DIFFERENTIAL EQUATIONS & MATHEMATICAL MODELING	Slope Fields	<ul style="list-style-type: none"> What is a differential equation? How do we solve differential equations? What is a slope field? How is a slope field constructed? 	I M	<ul style="list-style-type: none"> Define differential equation and slope field. Construct a slope field given an initial value and a differential equation. Interpret slope fields as visualizations of differential equations. 	<ul style="list-style-type: none"> Be able to calculate slopes by substituting into a differential equation. Sketch short tangent segments using these slopes. 	Feb. three weeks for this unit	<p>Homework</p> <p>Quiz</p> <p>Workbook</p>
	Anti-derivatives	<ul style="list-style-type: none"> How do we find the anti-derivatives of polynomial, exponential, logarithmic, and trigonometric functions? What is an indefinite integral? 	I M	<ul style="list-style-type: none"> Define indefinite integral. Find anti-derivatives of polynomial, exponential, log, and trig. functions. Solve differential equations given an initial value. Apply the properties of indefinite 	<ul style="list-style-type: none"> Memorize rules for finding anti-derivatives. Construct anti-derivatives using the Fundamental Theorem of 	Mar.	<p>Homework</p> <p>Quiz</p> <p>Weekly Review Sheet</p>

		<ul style="list-style-type: none"> • What are the properties of indefinite integrals? 		integrals.	Calculus.		
	Integration by Substitution	<ul style="list-style-type: none"> • What other methods are needed to find an anti-derivative when the power rule alone is not sufficient? 	I M	<ul style="list-style-type: none"> • Determine when to use the substitution method. • Apply the substitution method for finding anti-derivatives. • Calculate u-limits. 	<ul style="list-style-type: none"> • Use variable representation: Let $u = \dots$ and $du = \dots$ 	Mar.	Homework Workbook Quiz
	Separation of Variables	<ul style="list-style-type: none"> • How do we find the anti-derivative of a function containing 2 variables? 	I M	<ul style="list-style-type: none"> • Solve differential equations using separation of variables. 	<ul style="list-style-type: none"> • Know anti-derivative rules (i.e., how to integrate both sides of a differential equation), and log and exponential rules. 	Mar.	Homework Workbook Quiz
	Exponential Growth and Decay	<ul style="list-style-type: none"> • What are some real-life applications to solving differential equations? 	I M	<ul style="list-style-type: none"> • State the Law of Exponential Change. • Solve problems involving exponential growth and decay in a variety of applications. 	<ul style="list-style-type: none"> • Know anti-derivative rules, and separation of variables method. 	Mar.	Homework Quiz Review and Test on unit
APPLICATIONS OF DEFINITE INTEGRALS	Integral as Net Change	<ul style="list-style-type: none"> • Can the techniques used in studying particle motion be generalized to other kinds of rates? • What does this mean: “the integral of a rate gives the net change” ? • How can we calculate 	I M	<ul style="list-style-type: none"> • Interpret a velocity function by describing the motion of a particle on either a horizontal or vertical axis. • Find the position of a particle given its displacement and initial position. • Calculate net distance traveled. 	<ul style="list-style-type: none"> • Know anti-derivative rules. 	Mar. three weeks for this unit	Homework Workbook Quiz Weekly Review Sheet

		total distance traveled given a velocity function?		<ul style="list-style-type: none"> • Calculate total distance traveled using the numerical integration calculator feature. • Calculate total accumulation and net change of quantities (other than those involving distance and velocity) using the integral. 			
	Areas in the Plane	<ul style="list-style-type: none"> • Can we find the areas between curves? • Can we integrate with respect to y ? 	I M	<ul style="list-style-type: none"> • Calculate the area between 2 curves with and without changing boundaries. • Calculate areas between 2 curves with respect to y. 	<ul style="list-style-type: none"> • Know anti-derivative rules. • Find the points of intersection of 2 curves. 	Mar.	Homework Workbook Quiz
	Volumes	<ul style="list-style-type: none"> • Can we use integrals to find volumes of solids? • What shapes should we use to “slice” solids in order to find volumes? 	I M	<ul style="list-style-type: none"> • State the calculus definition for volume of a solid. • Calculate the volume of a solid by the disk and washer methods with respect to x and with respect to y. • Calculate the volume of a solid by other cross-section shapes. 	<ul style="list-style-type: none"> • $V = \int A(x)dx$ • $V = \int A(y)dy$ • $V = \pi \int R^2 dx$ • $V = \pi \int R^2 dy$ $V = \pi \int (R^2 - r^2) dx$ or dy 	Mar./Apr	Homework Workbook Volume Lab Quiz Review and Test on Entire Unit
L'HOPITAL'S RULE AND RATES OF GROWTH	L'Hopital's Rule (optional)	<ul style="list-style-type: none"> • How do we find the limits of indeterminate forms? 	I M	<ul style="list-style-type: none"> • Use l'Hopital's Rule for finding limits of rational functions and limits of indeterminate forms $0/0$ and ∞/∞ . 	<ul style="list-style-type: none"> • $f'(a)/g'(a)$ 	Apr. (1 day)	
	Relative Rates of Growth (optional)	<ul style="list-style-type: none"> • What functions grow the fastest and which grow the slowest? 	R	<ul style="list-style-type: none"> • Compare the relative magnitudes of functions and their rates of change. 	<ul style="list-style-type: none"> • Be able to graph $y = e^x$, $y = x^a$, $y = a^x$, and $y = \ln x$. 	Apr (1 day)	

**AP EXAM REVIEW
(about 3 weeks)**

AFTER THE AP EXAM	BC Calculus Topics	<ul style="list-style-type: none"> • What are some of the topics learned at the next level of Calculus? 	I M	<ul style="list-style-type: none"> • Choose a topic to teach to your classmates. You may work with another person. Prepare type-written set of lesson plans and a worksheet with examples, proofs, diagrams, problems, and so on for your students. You have one week to prepare for your lesson. 	<ul style="list-style-type: none"> • Length of curve • Improper integrals • Integration by parts • Euler's Method • Simpson's Rule • Parametric Functions and Calculus • Regression Models and Calculus • Vector applications to Calculus • Polar Curves and Calculus 	May/ June	
	BC topics		M	<ul style="list-style-type: none"> • Be prepared to answer questions on your classmates' lessons. 		June	Quizzes on each topic presented by students.

**SCHOOL EXAM ON STUDENTS' BC TOPICS
June
(2 days in class)**