

Guardian Angels School

Math Curriculum

MATH MISSION STATEMENT

The ultimate purpose of teaching mathematics is to educate students to use God's gifts to think critically, solve problems, and make decisions using the principles and processes of mathematics so that our students will have the capacity to be mathematically productive, moral citizens and life-long learners.

MATH OUTCOMES

- Students will understand mathematical problems and persevere in solving them.
- Students will be able to make sense of quantities and their relationship in problem situations.
- Students will be able to critique mathematical reasoning using stated assumptions, definitions, and previously established results.
- Students will apply mathematical concepts to solve problems that arise in everyday life, society, and the workplace.
- Students will use appropriate resources and tools to solve mathematical problems.
- Students will use correct terminology accurately and efficiently to communicate with precision.
- Students will look for and make use of structure when analyzing mathematics and problem solving.
- Students will look for and express regularity in repeated reasoning.

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YOUNG 5s

Counting and Cardinality	
	Know number names and the count sequence.
	<ul style="list-style-type: none"> Recognize numerals 1-10
	<ul style="list-style-type: none"> Write numerals 1-10
	<ul style="list-style-type: none"> Sequence numerals 1-10
	<ul style="list-style-type: none"> Recognize numerals 11-20
	<ul style="list-style-type: none"> Counts orally to 30
	<ul style="list-style-type: none"> Forms numerals correctly
	<ul style="list-style-type: none"> Skip count by 10's
	Count to tell the number of objects.
	<ul style="list-style-type: none"> 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.
	<ul style="list-style-type: none"> Given a number from 1-20, count out that many objects.
	<ul style="list-style-type: none"> Matches numerals to the number of objects
	Compare numbers.
	<ul style="list-style-type: none"> Understand concept of more/less

Measurement and Data	
	Classify objects and count the number of objects in each category.
	<ul style="list-style-type: none"> Classify objects into given categories.
	<ul style="list-style-type: none"> Count the number of objects in each category.
	<ul style="list-style-type: none"> Sort the categories by count (how many in each).

Geometry	
	Identify and describe shapes (squares, circles, triangles, rectangles, ovals, diamonds, hearts, and stars).
	<ul style="list-style-type: none"> Describe objects in the environment using names of shapes.
	<ul style="list-style-type: none"> Describe the relative positions of these objects using positional words (<i>above, below, beside, in front of, behind, and next to</i>).
	<ul style="list-style-type: none"> Model shapes in the world by drawing shapes

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Counting and Cardinality	
	Know number names and the count sequence.
	<ul style="list-style-type: none"> Count to 100 by ones
	<ul style="list-style-type: none"> Count to 100 by tens
	<ul style="list-style-type: none"> Count forward beginning from a given number within the known sequence (instead of having to begin at 1)
	<ul style="list-style-type: none"> Write numbers from 0 to 20
	<ul style="list-style-type: none"> Represent a number of objects with a written numeral 0 - 20
	Count to tell the number of objects.
	<ul style="list-style-type: none"> 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.
	<ul style="list-style-type: none"> Understand that the last number name said tells the number of objects counted.
	<ul style="list-style-type: none"> Understand that each successive number name refers to a quantity that is one larger.
	<ul style="list-style-type: none"> Count to answer “how many?” questions about as many as 20 things arranged in a line.
	<ul style="list-style-type: none"> Count to answer ‘how many?’ questions about as many as 20 things arranged in a rectangular array.
	<ul style="list-style-type: none"> Count to answer ‘how many?’ questions about as many as 20 things arranged in a circle.
	<ul style="list-style-type: none"> Count to answer ‘how many?’ questions about as many as 10 things in a scattered configuration.
	<ul style="list-style-type: none"> Given a number from 1-20, count out that many objects.
	Compare numbers.
	<ul style="list-style-type: none"> Identify whether the number of objects in one group is greater than the number of objects in another group.
	<ul style="list-style-type: none"> Identify whether the number of objects in one group is less than the number of objects in another group.
	<ul style="list-style-type: none"> Identify whether the number of objects in one group is equal to the number of objects in another group.
	<ul style="list-style-type: none"> Compare two numbers between 1 and 10 presented as written numerals.

Operations and Algebraic Thinking	
	Understand addition as putting together and adding to, and understanding subtraction as taking apart and taking from.
	<ul style="list-style-type: none"> • Represent addition with objects, fingers, mental images, drawings, sounds (e.g. claps), acting out situations, verbal explanations, expressions, or equations.
	<ul style="list-style-type: none"> • Represent subtraction with objects, fingers, mental images, drawings, sounds (e.g. claps), acting out situations, verbal explanations, expressions, or equations.
	<ul style="list-style-type: none"> • Solve addition word problems.
	<ul style="list-style-type: none"> • Solve subtraction word problems.
	<ul style="list-style-type: none"> • Practice addition within 10 by using objects or drawings to represent the problem.
	<ul style="list-style-type: none"> • Practice subtraction within 10 by using objects or drawings to represent the problem.
	<ul style="list-style-type: none"> • Decompose numbers less than 10 into pairs in more than one way by using objects or drawings.
	<ul style="list-style-type: none"> • Decompose numbers equal to 10 into pairs in more than one way by using objects or drawings.
	<ul style="list-style-type: none"> • Record each decomposition by a drawing or equation
	<ul style="list-style-type: none"> • For any number from 1 to 9, find the number that makes 10 when added to the given number by using objects.
	<ul style="list-style-type: none"> • For any number from 1 to 9, find the number that makes 10 when added to the given number by using drawings.
	<ul style="list-style-type: none"> • Record the answers using either a drawing or an equation.
	<ul style="list-style-type: none"> • Fluently add within 5
	<ul style="list-style-type: none"> • Fluently subtract within 5

Number and Operations in Base Ten	
	Work with numbers 11 – 19 to gain foundations for place value.
	<ul style="list-style-type: none"> • Compose numbers from 11 to 19 into ten ones and some further ones by using objects or drawings.
	<ul style="list-style-type: none"> • Record each composition by a drawing or equation.
	<ul style="list-style-type: none"> • Decompose numbers from 11 to 19 into ten ones and some further ones by using objects or drawings.
	<ul style="list-style-type: none"> • Record each decomposition by a drawing or equation.
	<ul style="list-style-type: none"> • Understand that these numbers are composed of ten ones, and one, two, three, four, five, six, seven, eight, or nine ones.

Measurement and Data	
	Describe and compare measurable attributes.
	<ul style="list-style-type: none"> Describe the length of objects.
	<ul style="list-style-type: none"> Describe the weight of objects.
	<ul style="list-style-type: none"> Describe several measurable attributes of a single object.
	<ul style="list-style-type: none"> Compare two objects with a measurable attribute in common to see which object has “more of” the attribute.
	<ul style="list-style-type: none"> Compare two objects with a measurable attribute in common to see which object has “less of” the attribute.
	Classify objects and count the number of objects in each category.
	<ul style="list-style-type: none"> Classify objects into given categories.
	<ul style="list-style-type: none"> Count the number of objects in each category.
	<ul style="list-style-type: none"> Sort the categories by count (how many in each).

Geometry	
	Identify and describe shapes (squares, circles, triangles, rectangles, hexagons, cubes, cones, cylinders, and spheres).
	<ul style="list-style-type: none"> Describe objects in the environment using names of shapes.
	<ul style="list-style-type: none"> Describe the relative positions of these objects using positional words (<i>above, below, beside, in front of, behind, and next to</i>).
	<ul style="list-style-type: none"> Correctly name shapes regardless of their orientations or overall size.
	<ul style="list-style-type: none"> Identify shapes as two-dimensional (“flat”).
	<ul style="list-style-type: none"> Identify shapes that are three-dimensional (“solid”).
	Analyze, compare, create and compose shapes.
	<ul style="list-style-type: none"> Analyze and compare two-dimensional shapes of different sizes using informal language to describe the following: similarities, differences, parts (# of sides and corners) & other attributes (such as having sides of equal length).
	<ul style="list-style-type: none"> Analyze and compare three-dimensional shapes of different sizes using informal language to describe the following: similarities, differences, parts (# of sides and corners) & other attributes (such as having sides of equal length).
	<ul style="list-style-type: none"> Analyze and compare two-dimensional shapes of different orientations using informal language to describe the following: similarities, differences, parts (# of sides and corners) & other attributes (such as having sides of equal length).
	<ul style="list-style-type: none"> Analyze and compare three-dimensional shapes of different orientations using informal language to describe the following: similarities, differences, parts (# of sides and corners) & other attributes (such as having sides of equal length).
	<ul style="list-style-type: none"> Model shapes in the world by building shapes from components (sticks, clay).

Geometry cont.	
	<ul style="list-style-type: none">• Model shapes in the world by drawing shapes
	<ul style="list-style-type: none">• Compose simple shapes to form larger shapes. <i>For example, "Can you join these two triangles with full sides touching to make a rectangle?"</i>

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GRADE ONE

Operations and Algebraic Thinking	
	Represent and solve problems involving addition and subtraction.
	<ul style="list-style-type: none"> Use addition within 20 to solve a word problem with unknowns in all positions.
	<ul style="list-style-type: none"> Use subtraction within 20 to solve a word problem with unknowns in all positions.
	<ul style="list-style-type: none"> Solve word problems that call for addition of three whole numbers whose sum is less than or equal to 20.
	Understand and apply properties of operations and the relationship between addition and subtraction.
	<ul style="list-style-type: none"> Apply the commutative property as a strategy to add numbers.
	<ul style="list-style-type: none"> Apply the commutative property as a strategy to subtract numbers.
	<ul style="list-style-type: none"> Apply the associative property as a strategy to add numbers
	<ul style="list-style-type: none"> Understand subtraction as an unknown –addend problem
	Add and subtract within 20.
	<ul style="list-style-type: none"> Relate counting to addition.
	<ul style="list-style-type: none"> Relate counting to subtraction.
	<ul style="list-style-type: none"> Use various strategies to add within 20 demonstrating fluency within 10.
	<ul style="list-style-type: none"> Use various strategies to subtract within 20 demonstrating fluency within 10.
	Work with addition and subtraction equations.
	<ul style="list-style-type: none"> Understand the meaning of the equal sign, and determine if equations involving addition are true or false.
	<ul style="list-style-type: none"> Understand the meaning of the equal sign, and determine if equations involving subtraction are true or false.
	<ul style="list-style-type: none"> Determine the unknown whole number in an addition equation relating three whole numbers.
	<ul style="list-style-type: none"> Determine the unknown whole number in a subtraction equation relating three whole numbers.

Number and Operations in Base Ten	
	Extend the counting sequence.
	<ul style="list-style-type: none"> Count and write numbers to 120 starting from any number in the sequence and relate them to the quantities they represent.
	Understand place value
	Understand that the two digits of a two-digit number represent amounts of tens and ones.

Number and Operations in Base Ten cont.	
	<ul style="list-style-type: none"> • 10 can be thought of as a bundle of ten ones called a “ten.”
	<ul style="list-style-type: none"> • The numbers from 11 to 19 are composed of a ten and one, two, three, four, five, six, seven, eight, or nine ones.
	<ul style="list-style-type: none"> □ 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.
	<ul style="list-style-type: none"> • Compare two-digit numbers based on meanings of the tens and ones digits, by using the symbols for greater than, less than, or equal to.
	Use place value understanding and properties of operations to add and subtract.
	<ul style="list-style-type: none"> • Add a two-digit number and a one digit number within 100, using different strategies and explain the reasoning used.
	<ul style="list-style-type: none"> • Add a two-digit number and a multiple of 10 within 100, using different strategies and explain the reasoning used.
	<ul style="list-style-type: none"> • Given a two-digit number, mentally find 10 more or 10 less, without counting and explain the reasoning used.
	<ul style="list-style-type: none"> • Subtract multiples of 10 in the range 10-90 from multiples of 10 in the range of 10-90 using different strategies and explain the reasoning used.

Measurement and Data	
	Measure lengths indirectly and by iterating length units.
	<ul style="list-style-type: none"> • Order three objects by length.
	<ul style="list-style-type: none"> • Compare the lengths of two objects indirectly by the third object.
	<ul style="list-style-type: none"> • Express the length of an object as a whole number of length units by laying multiple copies of a shorter object end to end.
	Tell and write time.
	<ul style="list-style-type: none"> • Tell and write time in hours and half-hours using an analog clock.
	<ul style="list-style-type: none"> • Tell and write time in hours and half-hours using a digital clock.
	Represent and interpret data.
	<ul style="list-style-type: none"> • Organize, represent, and interpret data with up to three categories.
	<ul style="list-style-type: none"> • Ask and answer questions about the data used in graphs.

Geometry	
	Reason with shapes and their attributes.
	<ul style="list-style-type: none"> • Distinguish between defining attributes and non-defining attributes.
	<ul style="list-style-type: none"> • Build and draw shapes to possess defining attributes.
	<ul style="list-style-type: none"> • Compose two dimensional shapes to create a composite shape and compose new shapes from the composite shape.
	<ul style="list-style-type: none"> • Compose three dimensional shapes to create a composite shape and compose new shapes from the composite shape.

Geometry cont.	
	<ul style="list-style-type: none">• Divide circles into two or four equal shares and describe the shares using the appropriate fraction words.
	<ul style="list-style-type: none">• Divide rectangles into two or four equal shares and describe the shares using the appropriate fraction words.
	<ul style="list-style-type: none">• Describe the whole as two of, or four of the shares.
	<ul style="list-style-type: none">• Understand that dividing into more equal shares creates smaller shares.

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GRADE TWO

Operations and Algebraic Thinking	
	Represent and solve problems involving addition and subtraction
	<ul style="list-style-type: none"> Use addition within 100 to solve one and two step word problems with unknowns in all position
	<ul style="list-style-type: none"> Use subtraction within 100 to solve one and two step word problems with unknowns in all positions.
	Add and Subtract within 20
	<ul style="list-style-type: none"> Fluently add numbers within 20 using mental strategies.
	<ul style="list-style-type: none"> Fluently subtract numbers within 20 using mental strategies
	<ul style="list-style-type: none"> By the end of Grade 2 know from memory all sums of two one- digit numbers
	Work with equal groups of objects to gain foundations for multiplication
	<ul style="list-style-type: none"> Determine whether a group of up to 20 objects has an odd or even number of members
	<ul style="list-style-type: none"> Use addition to find total number of objects arranged in rectangular arrays with up to 5 rows and columns

Number and Operations in Base Ten	
	Understand Place Value
	Understand that the three digits of a three digit number represent amounts of hundreds, tens, and ones
	<ul style="list-style-type: none"> 100 can be thought of a bundle of ten tens--called "hundred"
	<ul style="list-style-type: none"> □ The numbers 100, 200, 300, 400, 500, 600, 700, 800, 900 refer to one, two, three, four, five, six, seven, eight, or nine hundreds
	<ul style="list-style-type: none"> Count within 1000; skip count by 5's, 10s, 100s
	<ul style="list-style-type: none"> Read and write numbers to 1000 using base-ten numerals, number names, and expanded form.
	<ul style="list-style-type: none"> Compare two three-digit numbers based on meanings of the hundreds, tens, and ones digits, using $>$, $=$, and $<$ symbols.
	Use place-value understanding and properties of operations to add and subtract.
	<ul style="list-style-type: none"> Fluently add and subtract with 100 using strategies based on place value, properties of operations, and/or the relationship between addition and subtraction
	<ul style="list-style-type: none"> Add up to four two-digit numbers using strategies based on place value and properties of operations

Number and Operations in Base Ten cont.	
	<ul style="list-style-type: none"> Add and subtract within 1000 using concrete models or drawings or strategies
	<ul style="list-style-type: none"> Understand that in adding or subtracting three-digit numbers, one adds or subtracts hundreds and hundreds, tens and tens, ones and ones; sometimes it is necessary to compose or decompose tens or hundreds
	<ul style="list-style-type: none"> Mentally add 10 or 100 to a given number 100-900
	<ul style="list-style-type: none"> Mentally subtract 10 or 100 from a given number 100-900
	<ul style="list-style-type: none"> Explain why addition strategies work, using place value and the properties of operations
	<ul style="list-style-type: none"> Explain why subtraction strategies work, using place value and the properties of operation.

Measurement and Data	
	Measure and estimate lengths in standard units.
	<ul style="list-style-type: none"> Measure the length of an object by selecting and using appropriate tools such as rulers, yardsticks, meter sticks, and measuring tapes.
	<ul style="list-style-type: none"> Measure the length of an object twice, using length units of different lengths for the two measurements
	<ul style="list-style-type: none"> Describe how the two measurements relate to the size of the unit chosen.
	<ul style="list-style-type: none"> Estimate lengths using units of inches, feet, centimeters, and meters
	<ul style="list-style-type: none"> Measure to determine how much longer one object is than another, expressing the length difference in terms of a standard length unit
	Relate addition and subtraction to length
	<ul style="list-style-type: none"> Use addition within 100 to solve word problems involving lengths that are given in the same units
	<ul style="list-style-type: none"> Use subtraction within 100 to solve word problems involving lengths that are given in the same units.
	<ul style="list-style-type: none"> Represent whole numbers as lengths from 0 on a number line diagram with equally spaced points corresponding to the numbers 0, 1, 2.
	<ul style="list-style-type: none"> Represent whole-number sums and differences within 100 on a number line diagram

Measurement and Data cont.	
	Work with Time and Money
	<ul style="list-style-type: none"> Tell and write time from analog clocks to the nearest five minutes using a.m. and p.m.
	<ul style="list-style-type: none"> Tell and write time from digital clocks to the nearest five minutes using a.m. and p.m.
	<ul style="list-style-type: none"> Solve word problems involving dollar bills, quarters, dimes, nickels and pennies, using \$ and ¢ symbols appropriately.
	Represent and interpret data
	<ul style="list-style-type: none"> Generate measurement data by measuring lengths of several objects to the nearest whole unit
	<ul style="list-style-type: none"> Show the measurement by making a line plot, where the horizontal scale is marked off in show-number units.
	<ul style="list-style-type: none"> Draw a picture graph with single unit scale to represent a data set with up to four categories
	<ul style="list-style-type: none"> Draw a bar graph with single unit scale to represent a data set with up to four categories.
	<ul style="list-style-type: none"> Solve simple put-together, take-apart, and compare problems using information presented in a bar graph.

Geometry	
	Reason with shapes and their attributes
	<ul style="list-style-type: none"> Recognize and draw shapes having specified attributes
	<ul style="list-style-type: none"> Identify triangles, quadrilaterals, pentagons, hexagons, and cubes.
	<ul style="list-style-type: none"> Partition a rectangle into rows and columns of same-size squares and count to find the total number of them.
	<ul style="list-style-type: none"> Partition circles and rectangles into two, three, or four equal shares.
	<ul style="list-style-type: none"> Describe the shares using the words halves, thirds, half of, a third of, etc.
	<ul style="list-style-type: none"> Describe a whole as two halves, three thirds, four fourths.
	<ul style="list-style-type: none"> Recognize that equal shares of identical wholes need not have the same shape.

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GRADE THREE

Operations and Algebraic Thinking	
	Represent and solve problems involving multiplication and division.
	<ul style="list-style-type: none"> • Interpret products of whole numbers
	<ul style="list-style-type: none"> • Interpret quotients of whole numbers
	<ul style="list-style-type: none"> • Use multiplication and division within 100 to solve word problems
	<ul style="list-style-type: none"> • Determine the unknown whole number in an equation relating three whole numbers
	Understand properties of multiplication and the relationship between multiplication and division
	<ul style="list-style-type: none"> • Apply properties of operations as strategies to multiply and divide
	<ul style="list-style-type: none"> • Understand division as an unknown – factor problem
	Multiply and divide within 100
	<ul style="list-style-type: none"> • Fluently multiply and divide within 100 using fact family strategies
	Solve problems involving the four operations and identify and explain patterns and arithmetic
	<ul style="list-style-type: none"> • Solve two step word problems using the four operations
	<ul style="list-style-type: none"> • Identify arithmetic patterns and explain them using properties of operations.

Number and Operations in Base Ten	
	Use place value and properties of operations to perform multi- digit arithmetic
	<ul style="list-style-type: none"> • Use place value understanding to round whole numbers to the nearest 10 or 100
	<ul style="list-style-type: none"> • Fluently add and subtract within 1000
	<ul style="list-style-type: none"> • Multiply one digit whole numbers by multiples of 10 in the range 10 - 90

Number and Operations – Fractions	
	Develop understanding of fractions as numbers
	<ul style="list-style-type: none"> Understand a fraction as the quantity formed by 1 part when a whole is partitioned into equal parts: understand a fraction a/b as the quantity formed by a parts of size $1/b$
	Understand and represent a fraction as a number on a number line
	<ul style="list-style-type: none"> Represent a fraction on a number line
	<ul style="list-style-type: none"> Represent a fraction on a number line diagram by marking off lengths from $1/b$ from 0
	Explain equivalence of fractions and compare fractions by their size
	<ul style="list-style-type: none"> Understand two fractions as equivalent
	<ul style="list-style-type: none"> Recognize and generate simple fractions
	<ul style="list-style-type: none"> Express whole numbers as fractions and recognize fractions that are equivalent to whole numbers
	<ul style="list-style-type: none"> Compare two fractions with the same numerator and denominator

Measurement and Data	
	Solve problems involving measurement and estimation of intervals of time, liquid, volumes, and masses of objects
	<ul style="list-style-type: none"> Tell, write, and measure time intervals in minutes
	<ul style="list-style-type: none"> Solve word problems involving addition and subtraction of time intervals in minutes
	<ul style="list-style-type: none"> Measure and estimate liquid volumes and masses of objects using standard units of grams, kilograms, and liters
	<ul style="list-style-type: none"> Add, subtract, multiply, or divide to solve one step word problems involving masses or volumes that are given in the same units
	Represent and interpret data
	<ul style="list-style-type: none"> Draw a scaled picture graph and bar graph to represent data set with several categories
	<ul style="list-style-type: none"> Solve one and two step problems using information presented in bar graphs
	<ul style="list-style-type: none"> Generate measurement data by measuring lengths using rulers marked in halves and fourths of an inch. Show the data by making a line plot
	Geometric Measurement: understand concepts of area and relate area to multiplication and addition
	Recognize area as an attribute of plane figures and understand a concepts of area measurement
	<ul style="list-style-type: none"> A square with side length 1 unit, called a “unit square” is said to have a “one square unit”
	<ul style="list-style-type: none"> A plane figure which can be covered without gaps or overlaps by n unit squares is said to have an area of n square units

Measurement and Data cont.	
	<ul style="list-style-type: none"> • Measure areas by counting unit squares
	Relate area to the operations of multiplication and addition
	<ul style="list-style-type: none"> • Find the area of a rectangle with whole number side lengths
	<ul style="list-style-type: none"> • Multiply side lengths to find areas of rectangles
	<ul style="list-style-type: none"> • Use tiling to show that the area of a rectangle with whole number side lengths a and $b + c$ is the sum of $a \times b$ and $a \times c$
	<ul style="list-style-type: none"> • Recognize area as additive. Find areas of rectilinear figures by decomposing them into non-overlapping rectangles
	Geometric measurement: recognize perimeter as an attribute of plan figures and distinguish between linear and area measures
	Solve mathematical problems involving perimeter of polygons
	<ul style="list-style-type: none"> • Find the perimeter of given and unknown side lengths

Geometry	
	Reason with shapes and their attributes
	<ul style="list-style-type: none"> • Understand that shapes in different categories may share attributes and that the shared attributes can define a larger category
	<ul style="list-style-type: none"> • Recognize rhombuses, rectangles, and squares as quadrilaterals
	<ul style="list-style-type: none"> • Draw examples of quadrilaterals that do not belong to sub-categories
	<ul style="list-style-type: none"> • Partition shapes into parts with equal areas
	<ul style="list-style-type: none"> • Express the area of each part as a unit fraction of a whole

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GRADE FOUR

Operations and Algebraic Thinking	
	Use the four operations with whole numbers to solve problems.
	<ul style="list-style-type: none"> Interpret a multiplication equation as a comparison e.g. $35 = 5 \times 7$ as 35 is 5 times 7 and 7 times 5
	<ul style="list-style-type: none"> Represent verbal statements of multiplicative comparisons as multiplication equations
	<ul style="list-style-type: none"> Multiply to solve word problems involving multiplicative comparison, e.g., by using drawings and equations with a symbol for the unknown number to represent the problem, distinguishing multiplicative comparison from additive comparison.¹
	<ul style="list-style-type: none"> Divide to solve word problems involving multiplicative comparison, e.g., by using drawings and equations with a symbol for the unknown number to represent the problem, distinguishing multiplicative comparison from additive comparison.¹
	<ul style="list-style-type: none"> Solve multistep word problems posed with whole numbers and having whole-number answers using the four operations, represent these problems using equations with a letter standing for the unknown quantity.
	<ul style="list-style-type: none"> Check the reasonableness of answers in word problems using mental computation and estimation strategies including rounding
	<ul style="list-style-type: none"> Solve division problems in which remainders must be interpreted.
	Gain familiarity with factors and multiples.
	<ul style="list-style-type: none"> Find all factor pairs for a whole number in the range 1–100. Recognize that a whole number is a multiple of each of its factors.
	<ul style="list-style-type: none"> Determine whether a given whole number in the range 1–100 is a multiple of a given one-digit number.
	<ul style="list-style-type: none"> Determine whether a given whole number in the range 1–100 is prime or composite.
	Generate and analyze patterns.
	<ul style="list-style-type: none"> Generate a number or shape pattern that follows a given rule. Identify apparent features of the pattern that were not explicit in the rule itself. <i>For example, given the rule “Add 3” and the starting number 1, generate terms in the resulting sequence and observe that the terms appear to alternate between odd and even numbers. Explain informally why the numbers will continue to alternate in this way.</i>

Number and Operations in Base Ten	
	Generalize place value understanding for multi-digit whole numbers.
	<ul style="list-style-type: none"> Recognize that in a multi-digit whole number, a digit in one place represents ten times what it represents in the place to its right. <i>For example, recognize that $700 \div 70 = 10$ by applying concepts of place value and division.</i>
	<ul style="list-style-type: none"> Read and write multi-digit whole numbers using base-ten numerals, number names, and expanded form.
	<ul style="list-style-type: none"> Compare two multi-digit numbers using $>$, $=$, and $<$ symbols to record the results of comparisons.
	<ul style="list-style-type: none"> Use place value understanding to round multi-digit whole numbers to any place.
	Use place value understanding and properties of operations to perform multi-digit arithmetic.
	<ul style="list-style-type: none"> Fluently add multi-digit whole numbers using the standard algorithm.
	<ul style="list-style-type: none"> Fluently subtract multi-digit whole numbers using the standard algorithm.
	<ul style="list-style-type: none"> Multiply a whole number of up to four digits by a one-digit whole number using strategies based on place value and the properties of operations. Illustrate and explain the calculation by using equations, rectangular arrays, and/or area models.
	<ul style="list-style-type: none"> Multiply two two-digit numbers, using strategies based on place value and the properties of operations. Illustrate and explain the calculation by using equations, rectangular arrays, and/or area models.
	<ul style="list-style-type: none"> Find whole-number quotients and remainders with up to four-digit dividends and one-digit divisors, using strategies based on place value, the properties of operations, and/or the relationship between multiplication and division. Illustrate and explain the calculation by using equations, rectangular arrays, and/or area models.

Number and Operations - Fractions	
	Extend understanding of fraction equivalence and ordering.
	<ul style="list-style-type: none"> Explain why a fraction a/b is equivalent to a fraction $(n \times a)/(n \times b)$ by using visual fraction models, with attention to how the number and size of parts of the parts differ even though the two fractions themselves are the same size. Use this principle to recognize and generate equivalent fractions.
	<ul style="list-style-type: none"> Compare two fractions with different numerators and different denominators by creating common denominators or numerators, or by comparing to a benchmark such as $\frac{1}{2}$. Recognize that these comparisons are valid only when two fractions refer to the same whole.
	<ul style="list-style-type: none"> Use $<$, $=$, or $>$ to record the comparisons and justify them with a visual fraction model.
	Build fractions from unit fractions by applying and extending previous understandings of operations of whole numbers.
	Understand a fraction a/b with $a > 1$ as a sum of fraction $1/b$
	<ul style="list-style-type: none"> Understand addition and subtraction of fractions as joining and separating parts referring to the same whole.
	<ul style="list-style-type: none"> Decompose a fraction into a sum of fractions with the same denominator in more than one way, recording each decomposition by an equation. Justify decompositions, e.g., by using a visual fraction model. <i>Examples:</i> $\frac{3}{8} = \frac{1}{8} + \frac{1}{8} + \frac{1}{8}$; $\frac{3}{8} = \frac{1}{8} + \frac{2}{8}$; $2 \frac{1}{8} = 1 + 1 + \frac{1}{8} = \frac{8}{8} + \frac{8}{8} + \frac{1}{8}$.
	<ul style="list-style-type: none"> Add mixed numbers with like denominators, e.g., by replacing each mixed number with an equivalent fraction, and/or by using properties of operations and the relationship between addition and subtraction.
	<ul style="list-style-type: none"> Subtract mixed numbers with like denominators, e.g., by replacing each mixed number with an equivalent fraction, and/or by using properties of operations and the relationship between addition and subtraction.
	<ul style="list-style-type: none"> Solve word problems involving addition and subtraction of fractions referring to the same whole and having like denominators e.g., by using visual fraction models and equations to represent the problem.
	Apply and extend previous understandings of multiplication to multiply a fraction by a whole number.
	<ul style="list-style-type: none"> Understand a fraction a/b as a multiple of $1/b$. <i>For example, use a visual fraction model to represent $\frac{5}{4}$ as the product $5 \times (\frac{1}{4})$, recording the conclusion by the equation $\frac{5}{4} = 5 \times (\frac{1}{4})$.</i>

Number and Operations – Fractions cont.	
	<ul style="list-style-type: none"> Understand a multiple of a/b as a multiple of $1/b$, and use this understanding to multiply a fraction by a whole number. For example, use a visual fraction model to express $3 \times (2/5)$ as $6 \times (1/5)$, recognizing this product as $6/5$. (In general, $n \times (a/b) = (n \times a)/b$.)
	<ul style="list-style-type: none"> Solve word problems involving multiplication of a fraction by a whole number, e.g., by using visual fraction models and equations to represent the problem. For example, if each person at a party will eat $3/8$ of a pound of roast beef, and there will be 5 people at the party, how many pounds of roast beef will be needed? Between what two whole numbers does your answer lie?
	Understand decimal notation for fractions, and compare decimal fractions.
	<ul style="list-style-type: none"> Express a fraction with denominator 10 as an equivalent fraction with denominator 100, and use this technique to add two fractions with respective denominators 10 and 100.² For example, express $3/10$ as $30/100$, and add $3/10 + 4/100 = 34/100$.
	<ul style="list-style-type: none"> Use decimal notation for fractions with denominators 10 or 100. For example, rewrite 0.62 as $62/100$; describe a length as 0.62 meters; locate 0.62 on a number line diagram.
	<ul style="list-style-type: none"> Compare two decimals to hundredths by reasoning about their size. Recognize that comparisons are valid only when the two decimals refer to the same whole. Record the results of comparisons with the symbols $>$, $=$, or $<$, and justify the conclusions, e.g., by using a visual model.

Measurement and Data	
	Solve problems involving measurement and conversion of measurements from a larger to smaller unit.
	<ul style="list-style-type: none"> Know relative sizes of measurement units within one system of units including km, m, cm
	<ul style="list-style-type: none"> Know relative sizes of measurement units within one system of units including kg, g
	<ul style="list-style-type: none"> Know relative sizes of measurement units within one system of units including lb, oz
	<ul style="list-style-type: none"> Know relative sizes of measurement units within one system of units including l, ml
	<ul style="list-style-type: none"> Know relative sizes of measurement units within one system of units including hr, min, sec.

Measurement and Data cont.	
	<ul style="list-style-type: none"> • Within a single system of measurement, express measurements in a larger unit in terms of a smaller unit. Record measurement equivalents in a two-column table. <i>For example, know that 1 ft is 12 times as long as 1 in. Express the length of a 4 ft snake as 48 in. Generate a conversion table for feet and inches listing the number pairs (1, 12), (2, 24), (3, 36), ...</i>
	<ul style="list-style-type: none"> • Use the four operations to solve word problems involving distances, intervals of time, including problems involving simple fractions or decimals, and problems that require expressing measurements given in a larger unit in terms of a smaller unit. Represent measurement quantities using diagrams such as number line diagrams that feature a measurement scale.
	<ul style="list-style-type: none"> • Use the four operations to solve word problems involving liquid volumes and masses of objects including problems involving simple fractions or decimals, and problems that require expressing measurements given in a larger unit in terms of a smaller unit. Represent measurement quantities using diagrams such as number line diagrams that feature a measurement scale.
	<ul style="list-style-type: none"> • Use the four operations to solve word problems involving money, including problems involving simple fractions or decimals. Represent measurement quantities using diagrams such as number line diagrams that feature a measurement scale.
	<ul style="list-style-type: none"> • Use the four operations to solve word problems that require expressing measurements given in a larger unit in terms of a smaller unit. Represent measurement quantities using diagrams such as number line diagrams that feature a measurement scale.
	<ul style="list-style-type: none"> • Apply the area and perimeter formulas for rectangles in real world and mathematical problems. <i>For example, find the width of a rectangular room given the area of the flooring and the length, by viewing the area formula as a multiplication equation with an unknown factor.</i>
	Represent and Interpret data
	<ul style="list-style-type: none"> • Make a line plot to display a data set of measurements in fractions of a unit ($\frac{1}{2}$, $\frac{1}{4}$, $\frac{1}{8}$).
	<ul style="list-style-type: none"> • Solve problems involving addition and subtraction of fractions by using information presented in line plots. <i>For example, from a line plot find and interpret the difference in length between the longest and shortest specimens in an insect collection</i>

Measurement and Data cont.	
	Geometric measurement: understand concepts of angle and measure angles.
	Recognize angles as geometric shapes that are formed wherever two rays share a common endpoint, and understand concepts of angle measurement:
	<ul style="list-style-type: none"> An angle is measured with reference to a circle with its center at the common endpoint of the rays, by considering the fraction of the circular arc between the points where the two rays intersect the circle. An angle that turns through $1/360$ of a circle is called a “one-degree angle,” and can be used to measure angles.
	<ul style="list-style-type: none"> An angle that turns through n one-degree angles is said to have an angle measure of ndegrees.
	<ul style="list-style-type: none"> Measure angles in whole-number degrees using a protractor. Sketch angles of specified measure.
	<ul style="list-style-type: none"> Recognize angle measure as additive. When an angle is decomposed into non-overlapping parts, the angle measure of the whole is the sum of the angle measures of the parts.
	<ul style="list-style-type: none"> Solve addition and subtraction problems to find unknown angles on a diagram in real world and mathematical problems, e.g., by using an equation with a symbol for the unknown angle measure.

Geometry	
	Draw and identify lines and angles, and classify shapes by properties of their lines and angles.
	<ul style="list-style-type: none"> Draw points, lines, line segments, and rays and identify these as two-dimensional figures
	<ul style="list-style-type: none"> Draw right, acute, and obtuse angles and identify these as two-dimensional figures
	<ul style="list-style-type: none"> Draw parallel and perpendicular lines and identify these as two-dimensional figures
	<ul style="list-style-type: none"> Classify two-dimensional figures based on the presence or absence of parallel and perpendicular lines
	<ul style="list-style-type: none"> Classify two-dimensional figures based on the presence or absence of angles of a specified size
	<ul style="list-style-type: none"> Identify right triangles and recognize right triangles as a category
	<ul style="list-style-type: none"> Recognize a line of symmetry for a two-dimensional figure as a line across the figure such that the figure can be folded along the line into matching parts.
	<ul style="list-style-type: none"> Draw lines of symmetry and identify line-symmetric figures.

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Math Curriculum

GRADE FIVE

Operations and Algebraic Thinking	
	Write and interpret numerical expressions
	<ul style="list-style-type: none"> Use parentheses, brackets, or braces in numerical expressions, and evaluate expressions with these symbols
	<ul style="list-style-type: none"> Write simple expressions that record calculations. <i>For example, express the calculation “add 8 and 7, then multiply by 2” as $2 \times (8 + 7)$.</i>
	<ul style="list-style-type: none"> Interpret numerical expressions without evaluating them. <i>For example, recognize that $3 \times (18932 + 921)$ is three times as large as $18932 + 921$, without having to calculate the indicated sum or product.</i>
	Analyze patterns and relationships.
	<ul style="list-style-type: none"> Generate two numerical patterns using two given rules. Identify apparent relationships between corresponding terms. Form ordered pairs consisting of corresponding terms from the two patterns. <i>For example, given the rule “Add 3” and the starting number 0, and given the rule “Add 6” and the starting number 0, generate terms in the resulting sequences. e.g. (0,3,6,9,12,15) and (0,6,12,18,24,30)</i>
	<ul style="list-style-type: none"> <i>Given the rule “Add 3” and the starting number 0, and given the rule “Add 6” and the starting number 0, observe that the terms in one sequence are twice the corresponding terms in the other sequence. Explain informally why this is so.</i>
	<ul style="list-style-type: none"> Graph the ordered pairs on a coordinate plane. e.g. (0, 0) (3,6) (6,12) (9,18) (12,24) (15,30)

Number and Operations in Base Ten	
	Understand the place value system.
	<ul style="list-style-type: none"> Recognize that in a multi-digit number, a digit in one place represents 10 times as much as it represents in the place to its right.
	<ul style="list-style-type: none"> Recognize that in a multi-digit number, a digit in one place represents 1/10 of what it represents in the place to its left.
	<ul style="list-style-type: none"> Explain patterns in the number of zeros of the product when multiplying a number by powers of 10.
	<ul style="list-style-type: none"> Explain patterns in the placement of the decimal point when a decimal is multiplied by a power of 10.

Number and Operations in Base Ten cont.	
	<ul style="list-style-type: none"> • Explain patterns in the placement of the decimal point when a decimal is divided by a power of 10.
	<ul style="list-style-type: none"> • Use whole-number exponents to denote powers of 10.
	<ul style="list-style-type: none"> • Read and write decimals to thousandths using base-ten numerals, number names, and expanded form, e.g., $347.392 = 3 \times 100 + 4 \times 10 + 7 \times 1 + 3 \times (1/10) + 9 \times (1/100) + 2 \times (1/1000)$.
	<ul style="list-style-type: none"> • Compare two decimals to thousandths based on meanings of the digits in each place, using $>$, $=$, and $<$ symbols to record the results of comparisons
	<ul style="list-style-type: none"> • Use place value understanding to round decimals to any place.
	Perform operations with multi-digit whole numbers and with decimals to hundredths.
	<ul style="list-style-type: none"> • Fluently multiply multi-digit whole numbers using the standard algorithm.
	<ul style="list-style-type: none"> • Find whole-number quotients of whole numbers with up to four-digit dividends and two-digit divisors, using strategies based on place value.
	<ul style="list-style-type: none"> • Find whole-number quotients of whole numbers with up to four-digit dividends and two-digit divisors, using strategies based on the properties of operations, and/or the relationship between multiplication and division.
	<ul style="list-style-type: none"> • Find whole-number quotients of whole numbers with up to four-digit dividends and two-digit divisors, using strategies based on and/or the relationship between multiplication and division.
	<ul style="list-style-type: none"> • Illustrate and explain the calculation of quotients of whole numbers with up to four digit dividends and two digit divisors by using equations, rectangular arrays, and/or area models.
	<ul style="list-style-type: none"> • Add decimals to hundredths, 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.
	<ul style="list-style-type: none"> • Subtract decimals to hundredths, 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.

Number and Operations in Base Ten cont.	
	<ul style="list-style-type: none"> Multiply decimals to hundredths, 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.
	<ul style="list-style-type: none"> Divide decimals to hundredths, 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.

Number and Operations - Fractions	
	Use equivalent fractions as a strategy to add and subtract fractions.
	<ul style="list-style-type: none"> Add fractions with unlike denominators by replacing given fractions with equivalent fractions in such a way as to produce an equivalent sum of fractions with like denominators. <i>For example, $\frac{2}{3} + \frac{5}{4} = \frac{8}{12} + \frac{15}{12} = \frac{23}{12}$. (In general, $\frac{a}{b} + \frac{c}{d} = \frac{ad + bc}{bd}$.)</i>
	<ul style="list-style-type: none"> Subtract fractions with unlike denominators by replacing given fractions with equivalent fractions in such a way as to produce an equivalent difference of fractions with like denominators. <i>For example, $\frac{2}{3} + \frac{5}{4} = \frac{8}{12} + \frac{15}{12} = \frac{23}{12}$. (In general, $\frac{a}{b} + \frac{c}{d} = \frac{ad + bc}{bd}$.)</i>
	<ul style="list-style-type: none"> Add and subtract mixed numbers with unlike denominators by replacing the given fraction of the mixed number with equivalent fractions in such a way as to produce an equivalent sum or difference of fractions with like denominators. <i>For example, $\frac{5}{4} - \frac{2}{3} = \frac{15}{12} - \frac{8}{12} = \frac{7}{12}$</i>
	<ul style="list-style-type: none"> Solve word problems involving addition of fractions referring to the same whole, including cases of unlike denominators, e.g., by using visual fraction models or equations to represent the problem.
	<ul style="list-style-type: none"> Solve word problems involving subtraction of fractions referring to the same whole, including cases of unlike denominators, e.g., by using visual fraction models or equations to represent the problem.
	<ul style="list-style-type: none"> Solve word problems involving addition and subtraction of fractions referring to the same whole, including cases of unlike denominators, Use benchmark fractions and number sense of fractions to estimate mentally and assess the reasonableness of answers. <i>For example, recognize an incorrect result $\frac{2}{5} + \frac{1}{2} = \frac{3}{7}$, by observing that $\frac{3}{7} < \frac{1}{2}$.</i>

Number and Operations – Fractions cont.	
	Apply and extend previous understandings of multiplication and division to multiply and divide fractions.
	<ul style="list-style-type: none"> Interpret a fraction as division of the numerator by the denominator ($a/b = a \div b$).
	<ul style="list-style-type: none"> Solve word problems involving division of whole numbers leading to answers in the form of fractions or mixed numbers, e.g., by using visual fraction models or equations to represent the problem. <i>For example, interpret $3/4$ as the result of dividing 3 by 4.</i>
	<ul style="list-style-type: none"> <i>Understand that $3/4$ multiplied by 4 equals 3, and that when 3 wholes are shared equally among 4 people each person has a share of size $3/4$. If 9 people want to share a 50-pound sack of rice equally by weight, how many pounds of rice should each person get? Between what two whole numbers does your answer lie?</i>
	Apply and extend previous understandings of multiplication to multiply a fraction or whole number by a fraction.
	<ul style="list-style-type: none"> Interpret the product $(a/b) \times q$ as a parts of a partition of q into b equal parts; equivalently, as the result of a sequence of operations $a \times q \div b$. <i>For example, use a visual fraction model to show $(2/3) \times 4 = 8/3$, and create a story context for this equation. (In general, $(a/b) \times (c/d) = ac/bd$).</i>
	<ul style="list-style-type: none"> Find the area of a rectangle with fractional side lengths by tiling it with unit squares of the appropriate unit fraction side lengths, and show that the area is the same as would be found by multiplying the side lengths. Multiply fractional side lengths to find areas of rectangles and represent fraction products as rectangular areas.
	Interpret multiplication as scaling (resizing), by:
	<ul style="list-style-type: none"> Comparing the size of a product to the size of one factor on the basis of the size of the other factor, without performing the indicated multiplication
	<ul style="list-style-type: none"> Explaining why multiplying a given number by a fraction greater than 1 results in a product greater than the given number (recognizing multiplication by whole numbers greater than 1 as a familiar case).
	<ul style="list-style-type: none"> Explain why multiplying a given number by a fraction less than 1 results in a product smaller than the given number; and relating the principle of fraction equivalence $a/b = (n \times a)/(n \times b)$ to the effect of multiplying a/b by 1

Number and Operations – Fractions cont.	
	<ul style="list-style-type: none"> Solve real world problems involving multiplication of fractions and mixed numbers, e.g., by using visual fraction models or equations to represent the problem.
	Apply and extend previous understandings of division to divide unit fractions by whole numbers and whole numbers by unit fractions.
	<ul style="list-style-type: none"> Interpret division of a unit fraction by a non-zero whole number, and compute such quotients. <i>For example, create a story context for $(1/3) \div 4$, and use a visual fraction model to show the quotient. Use the relationship between multiplication and division to explain that $(1/3) \div 4 = 1/12$ because $(1/12) \times 4 = 1/3$.</i>
	<ul style="list-style-type: none"> Interpret division of a whole number by a unit fraction, and compute such quotients. <i>For example, create a story context for $4 \div (1/5)$, and use a visual fraction model to show the quotient. Use the relationship between multiplication and division to explain that $4 \div (1/5) = 20$ because $20 \times (1/5) = 4$</i>
	<ul style="list-style-type: none"> Solve real world problems involving division of unit fractions by non-zero whole numbers and division of whole numbers by unit fractions, e.g., by using visual fraction models and equations to represent the problem. <i>For example, how much chocolate will each person get if 3 people share $1/2$ lb of chocolate equally? How many $1/3$-cup servings are in 2 cups of raisins?</i>

Measurement and Data	
	Convert like measurement units within a given measurement system.
	<ul style="list-style-type: none"> Convert among different-sized standard measurement units within a given measurement system (e.g., convert 5 cm to 0.05 m), and use these conversions in solving multi-step, real world problems.
	Represent and interpret data.
	<ul style="list-style-type: none"> Make a line plot to display a data set of measurements in fractions of a unit ($1/2$, $1/4$, $1/8$).
	<ul style="list-style-type: none"> Use operations on fractions for this grade to solve problems involving information presented in line plots. <i>For example, given different measurements of liquid in identical beakers, find the amount of liquid each beaker would contain if the total amount in all the beakers were redistributed equally.</i>
	Geometric measurement: understand concepts of volume and relate volume to multiplication and to addition.

Measurement and Data cont.	
	Recognize volume as an attribute of solid figures and understand concepts of volume measurement.
	<ul style="list-style-type: none"> • A cube with side length 1 unit, called a “unit cube,” is said to have “one cubic unit” of volume, and can be used to measure volume
	<ul style="list-style-type: none"> • A solid figure which can be packed without gaps or overlaps using n unit cubes is said to have a volume of n cubic units
	<ul style="list-style-type: none"> • Measure volumes by counting unit cubes, using cubic cm, cubic in, cubic ft, and improvised units.
	Relate volume to the operations of multiplication and addition.
	<ul style="list-style-type: none"> • Find the volume of a right rectangular prism with whole-number side lengths by packing it with unit cubes.
	<ul style="list-style-type: none"> • Show that the volume of a right rectangular prism packed with unit cubes is the same as would be found by multiplying the edge lengths, equivalently by multiplying the height by the area of the base. Represent threefold whole-number products as volumes, e.g., to represent the associative property of multiplication.
	<ul style="list-style-type: none"> • Apply the formulas $V = l \times w \times h$ and $V = b \times h$ for rectangular prisms to find volumes of right rectangular prisms with whole-number edge lengths in the context of solving real world and mathematical problems
	<ul style="list-style-type: none"> • Recognize volume as additive. Find volumes of solid figures composed of two non-overlapping right rectangular prisms by adding the volumes of the non-overlapping parts, applying this technique to solve real world problems.
	<ul style="list-style-type: none"> • Solve real world and mathematical problems involving volume.

Geometry	
	Graph points on the coordinate plane to solve real-world and mathematical problems.
	<ul style="list-style-type: none"> Use a pair of perpendicular number lines, called axes, to define a coordinate system, with the intersection of the lines (the origin) arranged to coincide with the 0 on each line.
	<ul style="list-style-type: none"> Given a point in the plane located by using an ordered pair of numbers, called its coordinates, e.g., (7,9), understand that the first number indicates how far to travel from the origin to the right or left on the horizontal axis, and the second number indicates how far to travel up or down from the origin on the vertical axis. With the convention that the names of the two axes and the coordinates correspond (e.g., x-axis and x-coordinate, y-axis and y-coordinate).
	<ul style="list-style-type: none"> Understand the convention that the names of the two axes and the coordinates correspond (e.g., x-axis and x-coordinate, y-axis and y-coordinate).E.g.,(7,9) would mean move to the right 7 places, and move up 9 spaces.
	<ul style="list-style-type: none"> Represent real world and mathematical problems by graphing points in the first quadrant of the coordinate plane.
	<ul style="list-style-type: none"> Interpret coordinate values of points on a coordinate plane in the context of the situation, real world or in a mathematical problem.
	Classify two-dimensional figures into categories based on their properties.
	<ul style="list-style-type: none"> Understand that attributes belonging to a category of two-dimensional figures also belong to all subcategories of that category. For example, all rectangles have four right angles and squares are rectangles, so all squares have four right angles.
	<ul style="list-style-type: none"> Classify two-dimensional figures in a hierarchy based on properties.

Guardian Angels School

Math Curriculum

GRADE SIX

Ratios and Proportional Relationships	
	Understand ratio concepts and use ratio reasoning to solve problems.
	<ul style="list-style-type: none"> Understand the concept of a ratio and use ratio language to describe a ratio relationship between two quantities.
	<ul style="list-style-type: none"> Understand the concept of a unit rate a/b associated with a ratio $a:b$ (with $b \neq 0$) and use rate language in the context of a ratio relationship.
	Use ratio and rate reasoning to solve real-world problems.
	<ul style="list-style-type: none"> Make 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.
	<ul style="list-style-type: none"> Solve unit rate problems including those involving unit pricing and constant speed.
	<ul style="list-style-type: none"> Find a percent of a quantity as a rate per 100; solve problems involving finding the whole, given a part and the percent.
	<ul style="list-style-type: none"> Use ratio reasoning to convert measurement units.

The Number System	
	Apply and extend previous understandings of multiplication and division to divide fractions by fractions
	<ul style="list-style-type: none"> Interpret and compute quotients of fractions, and solve word problems involving division of fractions by fractions.
	Compute fluently with multi-digit numbers and find common factors and multiples.
	<ul style="list-style-type: none"> Fluently divide multi-digit numbers using the standard algorithm.
	<ul style="list-style-type: none"> Fluently add, subtract, multiply, and divide multi-digit decimals using the standard algorithm for each operation.
	<ul style="list-style-type: none"> Find the greatest common factor of two whole numbers less than or equal to 100.
	<ul style="list-style-type: none"> Find the least common multiple of two whole numbers less than or equal to 12.
	<ul style="list-style-type: none"> 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.
	Apply and extend previous understandings of numbers to the system of rational numbers.
	<ul style="list-style-type: none"> Understand that positive and negative numbers are used together to describe quantities having opposite directions or values.

The Number System cont.	
	<ul style="list-style-type: none"> Understand a rational number as a point on the number line.
	<ul style="list-style-type: none"> Extend the coordinate axes to incorporate negative number coordinates.
	Understand ordering and absolute value of rational numbers.
	<ul style="list-style-type: none"> Interpret statements of inequality as statements about the relative position of two numbers on a number line diagram.
	<ul style="list-style-type: none"> Write, interpret, and explain statements of order for rational numbers in real-world contexts.
	<ul style="list-style-type: none"> Understand the absolute value of a rational number as its distance from 0 on the number line.
	<ul style="list-style-type: none"> Understand the absolute value of a rational number as its distance from 0 on the number line.
	<ul style="list-style-type: none"> Solve real-world and mathematical problems by graphing points in all four quadrants of the coordinate plane.
	<ul style="list-style-type: none"> Find distances between points with the same first coordinate or the same second coordinate.

Expressions and Equations	
	Apply and extend previous understandings of arithmetic to algebraic expressions.
	<ul style="list-style-type: none"> Write and evaluate numerical expressions involving whole-number exponents.
	<ul style="list-style-type: none"> Write, read, and evaluate expressions in which letters stand for numbers.
	<ul style="list-style-type: none"> Apply the distributive property.
	<ul style="list-style-type: none"> Factor binomials.
	<ul style="list-style-type: none"> Combine like terms.
	<ul style="list-style-type: none"> Apply the properties of operations to simplify or rewrite expressions.
	<ul style="list-style-type: none"> Identify when two expressions (algebraic or numeric) are equivalent.
	Reason about and solve one-variable equations and inequalities
	<ul style="list-style-type: none"> Use substitution to determine whether a given number in a specified set makes an equation or inequality true.
	<ul style="list-style-type: none"> Use variables to represent numbers and write expressions when applying mathematics to real-world scenarios.
	<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.
	<ul style="list-style-type: none"> Write an inequality of the form $x > c$ or $x < c$ to represent a constraint or condition in a real-world or mathematical problem.
	<ul style="list-style-type: none"> Recognize that inequalities of the form $x > c$ or $x < c$ have infinitely many solutions.

Expressions and Equations cont.	
	<ul style="list-style-type: none"> • Represent solutions of inequalities on number line diagrams.
	Represent and analyze quantitative relationships between dependent and independent variables.
	<ul style="list-style-type: none"> • Use variables to represent two quantities in a real-world problem that change in relationship to one another.
	<ul style="list-style-type: none"> • 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.
	<ul style="list-style-type: none"> • Analyze the relationship between the dependent and independent variables using graphs and tables, and relate these to the equation.

Geometry	
	Solve real-world and mathematical problems involving area, surface area, and volume.
	<ul style="list-style-type: none"> • Find the area of right triangles, other triangles, special quadrilaterals, and polygons by composing into rectangles or decomposing into triangles and other shapes.
	<ul style="list-style-type: none"> • Apply the formula $V = l w h$
	<ul style="list-style-type: none"> • 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.
	<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.

Statistics and Probability	
	Develop understanding of statistical variability.
	<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. <i>For example, “How old am I?” is not a statistical question, but “How old are the students in my school?” is a statistical question because one anticipates variability in students’ ages.</i>
	<ul style="list-style-type: none"> • 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.

Statistics and Probability cont.	
	<ul style="list-style-type: none"> Recognize that a measure of center for a numerical data set summarizes all of its values with a single number, while a measure of variation describes how its values vary with a single number.
	Summarize and describe distributions.
	<ul style="list-style-type: none"> Display numerical data in plots on a number line, including dot plots, histograms, and box plots.
	<ul style="list-style-type: none"> Summarize numerical data sets in relation to their context by reporting the number of observations.
	<ul style="list-style-type: none"> Summarize numerical data sets in relation to their context by describing the nature of the attribute under investigation, including how it was measured and its units of measurement.
	<ul style="list-style-type: none"> Summarize numerical data sets in relation to their context by giving quantitative measures of center (median and/or mean) and variability (interquartile range and/or mean absolute deviation), 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.
	<ul style="list-style-type: none"> Summarize numerical data sets in relation to their context by 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.

Guardian Angels School

Math Curriculum

GRADE SEVEN

Ratios and Proportional Relationships	
	<ul style="list-style-type: none"> • Compute unit rates
	<ul style="list-style-type: none"> • Decide whether two quantities are in a proportional relationship
	<ul style="list-style-type: none"> • Identify the constant of proportionality (unit rate)
	<ul style="list-style-type: none"> • Represent proportional relationships by equations.
	<ul style="list-style-type: none"> • Use proportional relationships to solve ratio and percent problems.

The Number System	
	<ul style="list-style-type: none"> • Identify situations in which opposite quantities to make 0 (additive inverses).
	<ul style="list-style-type: none"> • Understand subtraction of rational numbers as the additive inverse.
	<ul style="list-style-type: none"> • Multiply and divide rational numbers.
	<ul style="list-style-type: none"> • Understand that a negative product can come from two factors where either one or the other is negative.
	<ul style="list-style-type: none"> • Convert a rational number to a decimal using long division.
	<ul style="list-style-type: none"> • Understand that a rational number will either repeat or terminate in decimal form.
	<ul style="list-style-type: none"> • Solve real-world mathematical problems using the four operations of rational numbers.

Expressions and Equations	
	<ul style="list-style-type: none"> • Apply properties of operations to expand linear expressions with rational coefficients.
	<ul style="list-style-type: none"> • Understand that rewriting an expression in different forms in a problem context can shed light on the problem and how the quantities in it are related.
	<ul style="list-style-type: none"> • Solve multi-step real-life and mathematical problems posed with positive and negative rational numbers in any form. (converting into different forms to make things easier)
	<ul style="list-style-type: none"> • Solve word problems that lead to equations in the form $px+q=r$ and $p(x+q)=r$
	<ul style="list-style-type: none"> • Solve word problems that lead to inequalities in the form $px+q=r$ and $p(x+q)=r$

Geometry	
	<ul style="list-style-type: none"> Solve problems using scale drawings.
	<ul style="list-style-type: none"> Draw freehand, with a ruler/protractor, and with technology geometric shapes with given conditions.
	<ul style="list-style-type: none"> Describe 2D figures that result from slicing 3D figures as in plane sections of right rectangular prisms.
	<ul style="list-style-type: none"> Know the formulae for area and circumference of a circle.
	<ul style="list-style-type: none"> Use facts about supplementary, complementary, vertical, and adjacent angles in a multi-step problem to write and solve simple equations.
	<ul style="list-style-type: none"> Solve real-world and mathematical problems involving area, volume, surface. Triangles, quadrilaterals, polygons. Cubes, and right prisms.

Statistics and Probability	
	<ul style="list-style-type: none"> Understand that statistics can be used to gain information about a population based on a sample of said population.
	<ul style="list-style-type: none"> Use data from a random sample to draw inferences about a population with an unknown characteristic of interest.
	<ul style="list-style-type: none"> Informally assess the degree of visual overlap of two data distributions (like dot plots)
	<ul style="list-style-type: none"> Use measures of center and measures of variability for numerical data to draw informal comparative inferences about two populations.
	<ul style="list-style-type: none"> Summarize numerical data sets in relation to their context by reporting the number of observations.
	<ul style="list-style-type: none"> Understand that probability is between 0 and 1.
	<ul style="list-style-type: none"> Understand that probability expresses the likelihood of an event occurring.
	<ul style="list-style-type: none"> Understand that larger numbers indicate a greater likelihood of an event occurring and that a probability of 0 indicates impossibility.
	<ul style="list-style-type: none"> Approximate the probability of a chance event by collecting data.
	<ul style="list-style-type: none"> Develop a uniform probability model by assigning equal probability to all outcomes.
	<ul style="list-style-type: none"> Develop a probability model by observing frequencies in data generated from experiments.
	<ul style="list-style-type: none"> Find the probability of a compound event by using lists, tables, or diagrams.
	<ul style="list-style-type: none"> Understand that, just as with simple events, the probability of a compound event is the fraction of outcomes in the sample space for which the compound event occurs.
	<ul style="list-style-type: none"> Design and use a simulation of generate frequencies of compound events.

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Math Curriculum

GRADE EIGHT

The Number System	
	<ul style="list-style-type: none"> Know that numbers that are not rational are called irrational. Understand informally that every number has a decimal expansion.
	<ul style="list-style-type: none"> Use rational approximations of irrational numbers to compare the size of irrational numbers, locate them approximately on a number line diagram.

Expressions and Equations	
	<ul style="list-style-type: none"> Know and apply the properties of integer exponents to generate equivalent numerical expressions
	<ul style="list-style-type: none"> Use square root and cube root symbols to represent solutions to equations of the form $x^2 = p$ and $x^3 = p$.
	<ul style="list-style-type: none"> Use numbers expressed in the form of a single digit times a whole-number power of 10 to estimate very large or very small quantities, and to express how many times as much one is than the other.
	<ul style="list-style-type: none"> Perform operations with numbers expressed in scientific notation, including problems where both decimal and scientific notation are used.
	<ul style="list-style-type: none"> Graph proportional relationships, interpreting the unit rate as the slope of the graph.
	<ul style="list-style-type: none"> 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 vertical axis at b.
	<ul style="list-style-type: none"> Give examples of linear equations in one variable with one solution, infinitely many solutions, or no solutions.
	<ul style="list-style-type: none"> Solve linear equations with rational number coefficients, including equations whose solutions require expanding expressions using the distributive property and collecting like terms.
	<ul 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.

	<ul style="list-style-type: none"> Solve systems of two linear equations in two variables algebraically.
	<ul style="list-style-type: none"> Solve real-world and mathematical problems leading to two linear equations in two variables.
Functions	
	<ul style="list-style-type: none"> 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.
	<ul style="list-style-type: none"> 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>
	<ul style="list-style-type: none"> 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.
	<ul style="list-style-type: none"> Construct a function to model a linear relationship between two quantities.
	<ul style="list-style-type: none"> 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.
	<ul style="list-style-type: none"> 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.
	<ul style="list-style-type: none"> Describe qualitatively the functional relationship between two quantities by analyzing a graph.

Geometry	
	<ul style="list-style-type: none"> Verify experimentally the properties of rotations, reflections, and translations:
	<ul style="list-style-type: none"> 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.
	<ul style="list-style-type: none"> Describe the effect of dilations, translations, rotations, and reflections on two-dimensional figures using coordinates.

Geometry cont.	
	<ul style="list-style-type: none"> 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.
	<ul style="list-style-type: none"> 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.
	<ul style="list-style-type: none"> Explain a proof of the Pythagorean Theorem and its converse.
	<ul style="list-style-type: none"> Apply the Pythagorean Theorem to determine unknown side lengths in right triangles in real-world and mathematical problems in two and three dimensions.
	<ul style="list-style-type: none"> Apply the Pythagorean Theorem to find the distance between two points in a coordinate system.
	<ul style="list-style-type: none"> Know the formulas for the volumes of cones, cylinders, and spheres and use them to solve real-world and mathematical problems.

Statistics and Probability	
	<ul style="list-style-type: none"> Construct and interpret scatter plots to investigate patterns of association between two quantities.
	<ul style="list-style-type: none"> Know that straight lines are widely used to model relationships between two quantitative variables.(line of best fit)
	<ul style="list-style-type: none"> Use the equation of a linear model to solve problems in the context of measurement data, interpreting the slope and intercept.
	<ul style="list-style-type: none"> Understand that patterns of association can be seen by displaying frequencies and relative frequencies in a two-way table
	<ul style="list-style-type: none"> 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>

