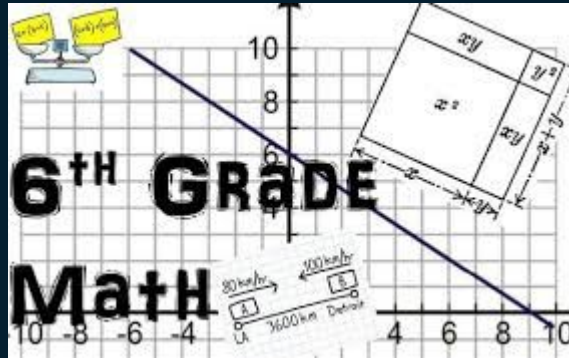


# 6th Grade Math Curriculum

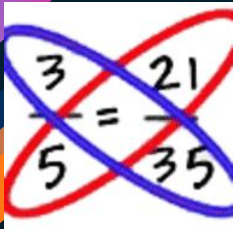
Given the high volume of standards, certain standards will be prioritized. These priority standards are highlighted in **red**.

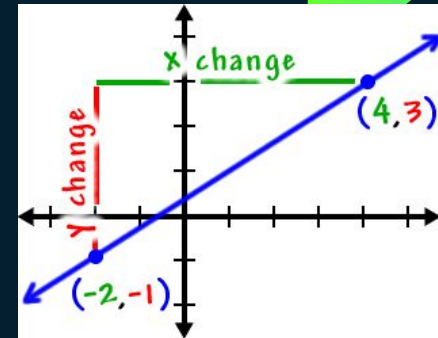


# Ratios and Proportions

Students will learn how to....

Analyze proportional relationships and use them to solve real-world and mathematical problems.


$$\frac{3}{5} = \frac{21}{35}$$

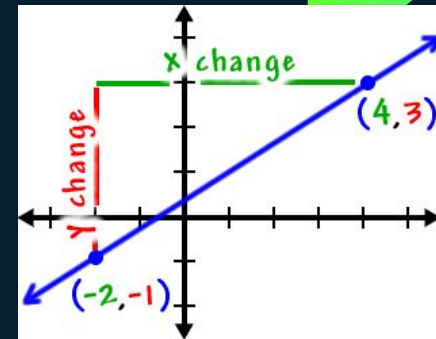


# Ratios and Proportions

## Enduring Understandings

- › Understand that real-world mathematical problems involving dependent and independent variables can be solved by applying ratio and rate concepts and procedures.
- › To be able to apply knowledge of percents and measurements to solve real-world problems. Understand that percents are used to calculate tax, tip, commission, and other such examples.
- › A ratio expresses the comparison between two quantities. Special types of ratios and rates, unit rates, measurement conversions, and percents.
- › A rate is a type of ratio that represents a measure, quantity, or frequency.
- › Ratio and rate reasoning can be applied to many different types of mathematical and real-life problems.
- › Proportions can be used to find a percent of a number.

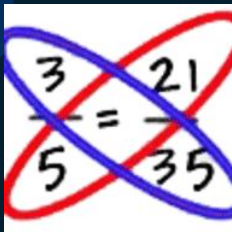
$$\frac{3}{5} = \frac{21}{35}$$

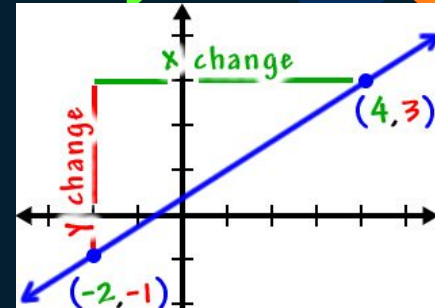


# Ratios and Proportions

## Common Core Standards

- › 6.RP.A.1 - Understand ratio concepts and use ratio reasoning to solve problems ~ Understand the concept of a ratio and use ratio language to describe a ratio relationship between two quantities.
- › 6.RP.A.2 - Understand ratio concepts and use ratio reasoning to solve problems ~ 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.
- › 6.RP.A.3 - Understand ratio concepts and use ratio reasoning to solve problems ~ Use ratio and rate reasoning to solve real-world and mathematical problems, e.g., by reasoning about tables of equivalent ratios, tape diagrams, double number line diagrams, or equations.
- › 6.RP.A.3a - Understand ratio concepts and use ratio reasoning to solve problems ~ 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. Use tables to compare ratios.
- › 6.RP.A.3b - Understand ratio concepts and use ratio reasoning to solve problems ~ Solve unit rate problems including those involving unit pricing and constant speed.
- › 6.RP.A.3c - Understand ratio concepts and use ratio reasoning to solve problems ~ Find a percent of a quantity as a rate per 100 (e.g., 30% of a quantity means 30/100 times the quantity); solve problems involving finding the whole, given a part and the percent.
- › 6.RP.A.3d - Understand ratio concepts and use ratio reasoning to solve problems ~ Use ratio reasoning to convert measurement units; manipulate and transform units appropriately when multiplying or dividing quantities.


$$\frac{3}{5} = \frac{21}{35}$$



# Rational Numbers

Students will learn how to....

Apply and extend previous understandings of operations with fractions to add, subtract, multiply, and divide rational numbers.



# Rational Numbers

## Enduring Understandings

- › Transfer: Fraction and decimal concepts and procedures to interpret, solve, and create real-world problem scenarios that involve operations with fractions and/or decimals.
- › Multiplication and division are inverse operations for whole numbers, fractions, and decimals.
- › The relationship of the location of the digits and the value of the digits is part of understanding multi-digit operations.
- › Division of fractions by fractions can be represented using multiple formats (manipulatives, diagrams, real-life situations, equations).
- › Operations on decimals and whole numbers are based upon place value relationships.



# Rational Numbers

## Enduring Understandings Continued...

- › Quantities having more or less than zero are described using positive and negative numbers.
- › Number lines are visual models used to compare numbers, including decimals and fractions.
- › The rational numbers can extend to the left or to the right on the number line, with negative numbers going to the left of zero, and positive numbers going to the right of zero.
- › Students will understand that positive and negative numbers are represented in the coordinate plane and in everyday situations, such as temperature, elevation, money and many more.
- › The coordinate plane is a tool for modeling real-world and mathematical situations and for solving problems, such as navigating locations and maps.



# Rational Numbers

## Common Core Standards

- › 6.NS.A.1 - Apply and extend previous understandings of multiplication and division to divide fractions by fractions ~ Interpret and compute quotients of fractions, and solve word problems involving division of fractions by fractions, e.g., by using visual fraction models and equations to represent the problem.
- › 6.NS.B.2 - Compute fluently with multi-digit numbers and find common factors and multiples ~ Fluently divide multi-digit numbers using the standard algorithm.
- › 6.NS.B.3 - Compute fluently with multi-digit numbers and find common factors and multiples ~ Fluently add, subtract, multiply, and divide multi-digit decimals using the standard algorithm for each operation.
- › 6.NS.B.4 - Compute fluently with multi-digit numbers and find common factors and multiples ~ 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 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.





# Rational Numbers

## Common Core Standards Continued..

- › 6.NS.C.5 - Apply and extend previous understandings of numbers to the system of rational numbers ~ Understand that positive and negative numbers are used together to describe quantities having opposite directions or values (e.g., temperature above/below zero, elevation above/below sea level, credits/debits, positive/negative electric charge); use positive and negative numbers to represent quantities in real-world contexts, explaining the meaning of 0 in each situation.
- › 6.NS.C.6 - Apply and extend previous understandings of numbers to the system of rational numbers ~ Understand a rational number as a point on the number line. Extend number line diagrams and coordinate axes familiar from previous grades to represent points on the line and in the plane with negative number coordinates.
- › 6.NS.C.6a - Apply and extend previous understandings of numbers to the system of rational numbers ~ Recognize opposite signs of numbers as indicating locations on opposite sides of 0 on the number line; recognize that the opposite of the opposite of a number is the number itself, e.g.,  $-(-3) = 3$ , and that 0 is its own opposite.
- › 6.NS.C.6b - Apply and extend previous understandings of numbers to the system of rational numbers ~ 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.
- › 6.NS.C.7 - Apply and extend previous understandings of numbers to the system of rational numbers ~ Understand ordering and absolute value of rational numbers.
- › 6.NS.C.7a - Apply and extend previous understandings of numbers to the system of rational numbers ~ Interpret statements of inequality as statements about the relative position of two numbers on a number line diagram.
- › 6.NS.C.7b - Apply and extend previous understandings of numbers to the system of rational numbers ~ Write, interpret, and explain statements of order for rational numbers in real-world contexts.
- › 6.NS.C.7c - Apply and extend previous understandings of numbers to the system of rational numbers ~ 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.
- › 6.NS.C.7d - Apply and extend previous understandings of numbers to the system of rational numbers ~ Distinguish comparisons of absolute value from statements about order.
- › 6.NS.C.8 - Apply and extend previous understandings of numbers to the system of rational numbers ~ Solve real-world and mathematical problems by graphing points in all four quadrants of the coordinate plane. Include use of coordinates and absolute value to find distances between points with the same first coordinate or the same second coordinate.

$$\frac{15}{x} = 5$$

# Expressions and Equations

Students will learn how to...

Solve real-life and mathematical problems using numerical and algebraic expressions and equations.

$$\frac{x}{5} \div 10$$

$$b + \pi = 10$$

$$w + 11$$

$$100 - x = 96$$

$$\frac{27}{b}$$

$$\frac{15}{x} = 5$$

# Expressions and Equations

## Enduring Understandings

- › Properties of operations are used to determine if expressions are equivalent.
- › There is a designated sequence to perform operations (Order of Operations).
- › Variables can be used as unique unknown values or as quantities that vary.
- › Algebraic expressions may be used to represent and generalize mathematical problems and real-life situations.
- › Students will understand that expressions are used to represent and interpret real-world and mathematical relationships.
- › Students understand that expressions can be written to represent relationships in data gathered from real-world or mathematical situations.

$$0 + \pi = 10$$

$$100 - x = 96$$

$$\frac{x}{5} \div 10$$

$$\frac{27}{b}$$

$$w + 11$$

$$\frac{15}{x} = 5$$

# Expressions and Equations

$$\frac{x}{5} \div 10$$

## Enduring Understandings Continued...

- › Solving equations is a reasoning process and follows established procedures based on properties.
- › Substitution is used to determine whether a given number in a set makes an equation or inequality true.
- › Variables may be used to represent a specific number or, in some situations, to represent all numbers in a specified set.
- › When one expression has a different value than a related expression, an inequality provides a way to show that relationship between the expressions: the value of one expression is greater than (or greater than or equal to) the value of the other expression instead of being equal.
- › Inequalities may have infinite solutions and there are methods for determining if an inequality has infinite solutions using graphs and equations.
- › Solutions of inequalities can be represented on a number line.
- › Graphs and equations represent relationships between variables.
- › Students will understand that equations and inequalities can be written, interpreted, and solved to represent real-world and mathematical situations.

$$\frac{27}{b}$$

$$0 + \pi = 10$$

$$w + 11$$

$$100 - x = 96$$

$$\frac{15}{x} = 5$$

# Expressions and Equations

$$\frac{x}{5} \div 10$$

## Common Core Standards

- › 6.EE.A.1 - Apply and extend previous understandings of arithmetic to algebraic expressions ~ Write and evaluate numerical expressions involving whole-number exponents.
- › 6.EE.A.2 - Apply and extend previous understandings of arithmetic to algebraic expressions ~ Write, read, and evaluate expressions in which letters stand for numbers.
- › 6.EE.A.2a - Apply and extend previous understandings of arithmetic to algebraic expressions ~ Write expressions that record operations with numbers and with letters standing for numbers.
- › 6.EE.A.2b - Apply and extend previous understandings of arithmetic to algebraic expressions ~ 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.
- › 6.EE.A.3 - Apply and extend previous understandings of arithmetic to algebraic expressions ~ Apply the properties of operations to generate equivalent expressions.
- › 6.EE.A.4 - Apply and extend previous understandings of arithmetic to algebraic expressions ~ Identify when two expressions are equivalent (i.e., when the two expressions name the same number regardless of which value is substituted into them).
- › 6.NS.B.4 - Compute fluently with multi-digit numbers and find common factors and multiples ~ 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 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.

$$0 + \pi = 10$$

$$\frac{27}{b}$$

$$w + 11$$

$$100 - x = 96$$

$$\frac{15}{x} = 5$$

# Expressions and Equations

$$\frac{x}{5} \div 10$$

## Common Core Standards Continued...

- › 6.EE.B.6 - Reason about and solve one-variable equations and inequalities ~ 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.
- › 6.EE.B.7 - Reason about and solve one-variable equations and inequalities ~ 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.
- › 6.EE.B.8 - Reason about and solve one-variable equations and inequalities ~ 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.
- › 6.EE.C.9 - Represent and analyze quantitative relationships between dependent and independent variables ~ 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. For example, in a problem involving motion at constant speed, list and graph ordered pairs of distances and times, and write the equation  $d = 65t$  to represent the relationship between distance and time.

$$0 + \pi = 10$$

$$\frac{27}{b}$$

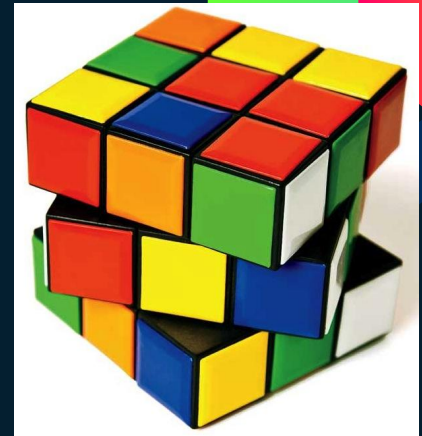
$$w + 11$$

$$100 - x = 96$$

# Geometry

Students will learn how to...

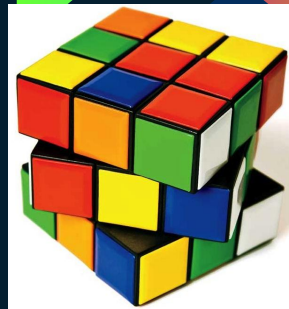
Draw, construct, and describe geometrical figures and describe the relationships between them.



# Geometry

## Enduring Understandings

- › Students will apply concepts and procedures for interpreting, representing and solving real-world and mathematical problems involving area, surface area and volume.
- › Geometry and spatial sense offer ways to envision, to interpret and to reflect on the world around us.
- › Area, volume and surface area are measurements that relate to each other and apply to objects and events in our real life experiences.
- › Properties of 2-dimensional shapes are used in solving problems involving 3-dimensional shapes.
- › The value of numbers and application of properties are used to solve problems about our world.
- › Understand that problems in area, surface area and volume can be applied to many different activities and professions, such as architecture, landscaping, construction, and many more.

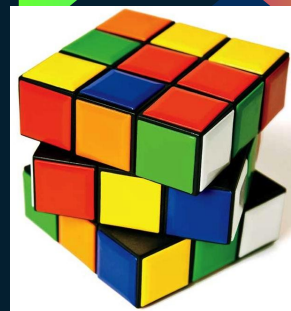




# Geometry

## Common Core Standards

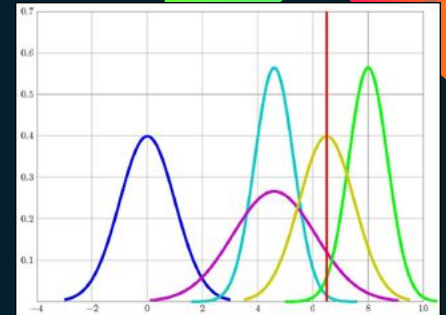
- › 6.G.A.1 - Solve real-world and mathematical problems involving area, surface area, and volume ~ Find the area of right triangles, other triangles, special quadrilaterals, and polygons by composing into rectangles or decomposing into triangles and other shapes; apply these techniques in the context of solving real-world and mathematical problems.
- › 6.G.A.2 - Solve real-world and mathematical problems involving area, surface area, and volume ~ 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 edge lengths of the prism. Apply the formulas  $V = l w h$  and  $V = b h$  to find volumes of right rectangular prisms with fractional edge lengths in the context of solving real-world and mathematical problems.
- › 6.G.A.3 - Solve real-world and mathematical problems involving area, surface area, and volume ~ 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.
- › 6.G.A.4 - Solve real-world and mathematical problems involving area, surface area, and volume ~ 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.



# Statistics & Probability

Students will learn how to...

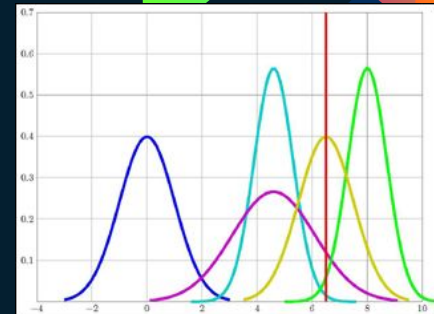
Investigate chance processes and develop, use and evaluate probability models.



# Statistics & Probability

## Enduring Understandings

- › Statistical questions and the answers account for variability in the data.
- › The distribution of a data set is described by its center, spread, and overall shape.
- › Measures of center for a numerical set of data are summaries of the values using a single number.
- › Measures of variability describe the variation of the values in the data set using a single number.
- › Students will understand that measures of center and variation are used when analyzing and presenting data collected using a statistical question.



# Statistics & Probability

## Common Core Standards

- › 6.SP.A.1 - Develop understanding of statistical variability ~ Recognize a statistical question as one that anticipates variability in the data related to the question and accounts for it in the answers.
- › 6.SP.A.2 - Develop understanding of statistical variability ~ 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.
- › 6.SP.A.3 - Develop understanding of statistical variability ~ 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.
- › 6.SP.B.4 - Summarize and describe distributions ~ Display numerical data in plots on a number line, including dot plots, histograms, and box plots.
- › 6.SP.B.5 - Summarize and describe distributions ~ Summarize numerical data sets in relation to their context, such as by:
  - › 6.SP.B.5a - Summarize and describe distributions ~ Reporting the number of observations.
  - › 6.SP.B.5b - Summarize and describe distributions ~ Describing the nature of the attribute under investigation, including how it was measured and its units of measurement.
  - › 6.SP.B.5c - Summarize and describe distributions ~ 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.
  - › 6.SP.B.5d - Summarize and describe distributions ~ Relating the choice of measures of center and variability to the shape of the data distribution.

