

Ratios And Proportional Relationships	6th Grade	7th Grade	8th Grade	8th Grade Functions
	<u>6.RP - Understand ratio concepts and use ratio reasoning to solve problems.</u>	<u>7.RP - Analyze proportional relationships and use them to solve real-world and mathematical problems</u>		
Ratios And Proportional Relationships			<u>8.EE.5 & 6 - Analyze and solve linear equations and pairs of simultaneous linear equations.</u>	
Ratios And Proportional Relationships	6.RP.3 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	7.RP.2 Recognize and represent proportional relationships between quantities.	8.EE.5: Graph proportional relationships, interpreting the unit rate as the slope of the graph. Compare two different proportional relationships represented in different ways. For example, compare a distance- time graph to a distance time equation to determine which of two	8.F.2: Compare properties of two functions each represented in a different way (algebraically, graphically, numerically in tables, or by verbal descriptions). For example, given a linear function

			moving objects has greater speed.	represented by a table of values and a linear function represented by an algebraic expression, determine which function has the greater rate of change.
Ratios And Proportional Relationships	6.R.P.2 See Above Description	7.R.P.2 See Above Description	8.EE.6 Use similar triangles to explain why the slope m is the same between any two distinct points on a non-vertical line in the coordinate plane; derive the equation $y = mx$ for a line through the origin and the equation $y = mx + b$ for a line intercepting the vertical axis at b .	8.F.3 Interpret the equation $y = mx + b$ as defining a linear function, whose graph is a straight line; give examples of functions that are not linear.. For example, the function $A = s$ squared giving the area of a square as a function of its side length is not linear because its graph contains the points (1,1), (2,4) and (3,9),

				which are not on a straight line.
Ratios And Proportional Relationships		7.R.P.2 See Above		<p>8.F.4</p> <p>Construct a function to model a linear relationship between two quantities. Determine the rate of change and initial value of the function from a description of a relationship or from two (x, y) values, including reading these from a table or from a graph. Interpret the rate of change and initial value of a linear function in terms of the situation it models, and in terms of its graph or a table of values.</p>

Ratios And Proportional Relationships	A. 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.	A. Decide whether two quantities are in a proportional relationship, e.g., by testing for equivalent ratios in a table or graphing on a coordinate plane and observing whether the graph is a straight line through the origin.		
Ratios And Proportional Relationships	B. Solve unit rate problems including those involving unit pricing and constant speed. For example, if it took 7 hours to mow 4 lawns, then at that rate, how many lawns could be mowed in 35 hours? At what rate were lawns being mowed?	B. Identify the constant of proportionality (unit rate) in tables, graphs, equations, diagrams, and verbal descriptions of proportional relationships.		
Ratios And Proportional Relationships	C. 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	7.RP.3: Use proportional relationships to solve multistep		

	involving finding the whole, given a part and the percent.	ratio and percent problems. Examples: simple interest, tax , markups and markdowns, gratuities and commissions, fees, percent increase and decrease, percent error.		
Ratios And Proportional Relationships	D. Use ratio reasoning to convert measurement units; manipulate and transform units appropriately when multiplying or dividing quantities.			
The Number System	6th Grade	7th Grade	8th Grade	
	<u>6.NS - Apply and extend previous understandings of multiplication and division to divide fractions by fractions.</u>	<u>7.NS - Apply and extend previous understandings of operations with fractions to add, subtract, multiply,</u>	<u>8.NS - Know that there are numbers that are not rational, and approximate them by rational numbers.</u>	

		<u>and divide rational numbers.</u>		
The Number System	<p>6.NS.1: 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. For example, create a story context for $(2/3) \div (3/4)$ and use a visual fraction model to show the quotient; use the relationship between multiplication and division to explain that $(2/3) \div (3/4) = 8/9$ because $3/4$ of $8/9$ is $2/3$. (In general, $(a/b) \div (c/d) = ad/bc$.) How much chocolate with each person get if 3 people share $1/2$ lb of chocolate equally? How many $3/4$-cup servings are in $2/3$ of a cup of yogurt? How wide is a rectangular strip of land with length $3/4$ mi and area $1/2$ square mi?</p>	<p>7.NS.2: Apply and extend previous understandings of multiplication and division and of fractions to multiply and divide rational numbers.</p> <p>A. Understand that multiplication is extended from fractions to rational numbers by requiring that operations continue to satisfy the properties of operations, particularly the distributive property, leading to products such as $(-1)(-1) = 1$ and the rules for multiplying signed numbers. Interpret products of rational numbers</p>	<p>8.NS.1: Understand informally that every number has a decimal expansion; the rational numbers are those with decimal expansions that terminate in 0s or eventually repeat. Know that other numbers are called irrational.</p>	

The Number System		<p>by describing real-world contexts.</p> <p>B. Understand that integers can be divided, provided that the divisor is not zero, and every quotient of integers (with non-zero divisor) is a rational number. If p and q are integers, then $-(p/q) = (-p)/q = p/(-q)$. Interpret quotients of rational numbers by describing real-world contexts.</p> <p>C. Apply properties of operations as strategies to multiply and divide rational numbers.</p> <p>D. Convert a rational number to a decimal using long division; know that the decimal</p>		
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		form of a rational number terminates in 0s or eventually repeats.		
Expressions and Equations	<u>6th Grade</u>	<u>7th Grade</u>	<u>8th Grade</u>	
	<u>6.EE - Apply and extend previous understandings of arithmetic to algebraic expressions.</u>	<u>7.EE - Use properties of operations to generate equivalent expressions.</u>	<u>8.EE - Work with radicals and integer exponents</u>	
Expressions and Equations	6.EE.2: Write, read, and evaluate expressions in which letters stand for numbers.		8.EE.1: Know and apply the properties of integer exponents to generate equivalent numerical expressions.	

<p>Expressions and Equations</p>	<p>6.EE.3: Apply the properties of operations to generate equivalent expressions. For example, apply the distributive property to the expression $3(2+x)$ to produce the equivalent expressions $6+3x$; apply the distributive property to the expression $24x + 18y$ to produce the equivalent expression $6(4x+3y)$; apply properties of operations to $y+y$ to produce the equivalent expression $3y$.</p>	<p>7.EE.1: Apply properties of operations as strategies to add, subtract, factor, and expand linear expressions with rational coefficients.</p>	<p>8.EE.2: Use square root and cube root symbols to represent solutions to equations of the form $x^2 = p$ and $x^3 = p$, where p is a positive rational number. Evaluate square roots of small perfect cubes. Know the square root of 2 is irrational.</p>	
<p>Expressions and Equations</p>		<p><u>7.EE.3 - Solve real-life and mathematical problems using numerical and algebraic expressions and equations.</u></p>		

Expressions and Equations		7.EE.3 Solve multi-step real-life and mathematical problems posed with positive and negative rational numbers in any form (whole numbers, fractions, and decimals), using tools strategically. Apply properties of operations to calculate with numbers in any form; convert between forms as appropriate; and assess the reasonableness of answers using mental computation and estimation strategies. For example: If a woman making \$25 an hour gets a 10% raise, she will make an additional $\frac{1}{10}$ of her salary an hour, or \$2.50, for a new salary of		
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		<p>\$27.50. If you want to place a towel bar $9\frac{3}{4}$ inches long in the center of a door that is $27\frac{1}{2}$ inches wide, you will need to place the bar about 9 inches from each edge; this estimate can be used as a check on the exact computation.</p>		
Expressions and Equations	<u>Reason about and solve one-variable equations and inequalities.</u>			
	<p>6.EE.7</p> <p>Solve real-world and mathematical problems by writing and solving equations of the form $x + p = q$ and $px = q$ for cases</p>	<p>7.EE.4</p> <p>Use variables to represent quantities in a real-world or mathematical problem, and</p>		

	<p>in which p, q and x are all nonnegative rational numbers.</p>	<p>construct simple equations and inequalities to solve problems by reasoning about the quantities.</p> <p>A. Solve word problems leading to equations of the form $px + q = r$ and $p(x + q) = r$, where p, q, and r are specific rational numbers. Solve equations of these forms fluently. Compare an algebraic solution to an arithmetic solution, identifying the sequence of the operations used in each approach. For example, the perimeter of a rectangle is 54 cm. Its length is 6 cm. What is its width?</p>		
<p>Expressions and Equations</p>			<p><u>Understand the connections between proportional</u></p>	

			<u>relationships, lines, and linear equations.</u>	
Expressions and Equations	<p>6.EE.8 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.</p>	<p>7.EE.4: B. Solve word problems leading to inequalities of the form $px + q > r$ or $px + q < r$, where p, q, and r are specific rational numbers. Graph the solution set of the inequality and interpret it in the context of the problem. For example: As a salesperson, you are paid \$50 per week plus \$3 per sale. This week you want your pay to be at least \$100. Write an inequality for the number of sales you need to make, and describe the solutions.</p>	<p>8.EE.7: Solve linear equations in one variable. A. Give examples of linear equations in one variable with one solution, infinitely many solutions, or no solutions. Show which of these possibilities is the case by successively transforming the given equation into simpler forms, until an equivalent equation of the form $x = a$, $a = a$, or $a = b$ results (where a and b are different numbers).</p>	

Expressions and Equations			8.EE.8: Analyze and solve pairs of simultaneous linear equations. A. Understand that solutions to a system of two linear equations in two variables correspond to points of intersection of their graphs, because points of intersection satisfy both equations simultaneously.	
Geometry	<u>6th Grade</u>	<u>7th Grade</u>	<u>8th Grade</u>	
	<u>Solve real-world and mathematical problems involving area, surface area, and volume</u>	<u>Draw, construct, and describe geometrical figures and describe the relationships between them.</u>		

<p>Geometry</p>	<p>6.G.1 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.</p>	<p>7.G.1 Solve problems involving scale drawings of geometric figures, including computing actual lengths and areas from a scale drawing and reproducing a scale drawing at a different scale.</p>		
<p>Geometry</p>			<p><u>Solve real-world and mathematical problems involving volume of cylinders, cones, and spheres.</u></p>	
<p>Geometry</p>	<p>6.G.2 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.</p>	<p>7.G.6 Solve real-world and mathematical problems involving area, volume and surface area of two- and three- dimensional objects composed of triangles, quadrilaterals,</p>	<p>8.G.9 Know the formulas for the volumes of cones, cylinders, and spheres and use them to solve real-world and mathematical problems.</p>	

	Apply the formulas $V = lwh$ and $V = bh$ to find volumes of right rectangular prisms with fractional edge lengths in the context of solving real-world and mathematical problems	polygons, cubes, and right prisms.		
Geometry			8.G.3 Describe the effect of dilations, translations, rotations, and reflections on two- dimensional figures using coordinates.	
Geometry		7.G.4-6 <u>Solve real-life and mathematical problems involving angle measure, area, surface area, and volume</u>		

Geometry	6.G.4 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.	7.G.4 Know the formulas for the area and circumference of a circle and use them to solve problems; give an informal derivation of the relationship between the circumference and area of a circle.		
Geometry		7.G.5 Use facts about supplementary, complimentary, vertical, and adjacent angles in a multi-step problem to write and solve simple equations for an unknown angle in a figure		
			<u>Understand and apply the Pythagorean Theorem</u>	

Geometry			8.G.7 Apply the Pythagorean Theorem to determine unknown side lengths in right triangles in real-world and mathematical problems in two and three dimensions.	
Statistics and Probability				
	<u>Develop understanding of statistical variability.</u>	<u>Use random sampling to draw inferences about a population.</u>	<u>Investigate patterns of association in bivariate data.</u>	
Statistics and Probability	6.SP.3 Recognize that a measure of center for 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.	7.SP.1 Understand that statistics can be used to gain information about a population by examining a sample of the population; generalizations about a population from a sample are valid only if the	8.SP.1 Construct and interpret scatter plots for bivariate measurement data to investigate patterns of association between two quantities. Describe patterns such as clustering, outliers, positive or negative association	

		sample is representative of that population. Understand that random sampling tends to produce representative samples and support valid inferences		
Statistics and Probability	6.SP.4 Display numerical data in plots on a number line, including dot plots, histograms, and box plots.	7.SP.4 Use measures of center and measures of variability for numerical data from random samples to draw informal comparative inferences about two populations. For example, decide whether the words in a chapter of a seventh-grade science book are generally longer than the words in a	8.SP.1 See Above	

		chapter of a fourth-grade science book.		
Statistics and Probability			<p>8.SP.3</p> <p>Use the equation of a linear model to solve problems in the context of bivariate measurement data, interpreting the slope and intercept. For example, in a linear model for a biology experiment, interpret a slope of 1.5 cm/hr as meaning that an additional hour of sunlight each day is associated with an additional 1.5 cm in mature plant height.</p>	
Statistics and Probability			<p>8.SP.4</p> <p>Understand that patterns of association can also be seen in bivariate categorical data by displaying frequencies and relative frequencies in a two-way table. Construct and interpret a two-way table summarizing data on two categorical variables</p>	

			collected from the same subjects. Use relative frequencies calculated for rows or columns to describe possible association between the two variables. For example, collect data from students in your class on whether or not they 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?	
Statistics and Probability		<u>Investigate chance processes and develop, use, and evaluate probability models.</u>		
Statistics and Probability		7.SP.5 Understand that the probability of a chance event is a		

Statistics and Probability		number between 0 and 1 that expresses the likelihood of the event occurring. Larger numbers indicate greater likelihood. A probability near 0 indicates an unlikely event, a probability around $1/2$ indicates an event that is neither unlikely nor likely, and a probability near 1 indicates a likely event.		
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