

# Knowre's Alignment to CCSS Mathematics Standards

Correlation Guide – Middle School Mathematics



## 7<sup>th</sup> Grade Course

### Ratios and Proportional Relationships

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

Code	Standards	Pre-Algebra Lessons	Algebra 1 Lessons
<b>7. RP. 1</b>	Compute unit rates associated with ratios of fractions, including ratios of lengths, areas and other quantities measured in like or different units.	Lesson 6-2	
<b>7. RP. 2</b>	Recognize and represent proportional relationships between quantities.		
a.	Decide whether two quantities are in a proportional relationship.	Lessons 6-1, 6-3	Lessons 2-5, 4-3
b.	Identify the constant of proportionality (unit rate) in tables, graphs, equations, diagrams, and verbal descriptions of proportional relationships.	Lessons 6-4, 6.5	Lesson 4-3
c.	Represent proportional relationships by equations.	Lessons 6-4, 6-5	Lesson 4-3
d.	Explain what a point $(x, y)$ on the graph of a proportional relationship means in terms of the situation, with special attention to the points $(0, 0)$ and $(1, r)$ where $r$ is the unit rate.		Lesson 4-3
<b>7. RP. 3</b>	Use proportional relationships to solve multistep ratio and percent problems.	Lessons 6-5, 7-4, 7-5	Lesson 2-6

### The Number System

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

Code	Standards	Pre-Algebra Lessons	Algebra 1 Lessons
<b>7. NS. 1</b>	Apply and extend previous understandings of addition and subtraction to add and subtract rational numbers; represent addition and subtraction on a horizontal or vertical number line diagram.		
a.	Describe situations in which opposite quantities combine to make 0.	Lessons 2-2, 2-3	

## 7<sup>th</sup> Grade Course

Code	Standards	Pre-Algebra Lessons	Algebra 1 Lessons
b.	Understand $p + q$ as the number located a distance $ q $ from $p$ , in the positive or negative direction depending on whether $q$ is positive or negative. Show that a number and its opposite have a sum of 0 (are additive inverses). Interpret sums of rational numbers by describing real-world contexts.	Lessons 2-2, 2-3, 5-2	
c.	Understand subtraction of rational numbers as adding the additive inverse, $p - q = p + (-q)$ . Show that the distance between two rational numbers on the number line is the absolute value of their difference, and apply this principle in real-world contexts.	Lessons 2-1, 2-2, 5-2	
d.	Apply properties of operations as strategies to add and subtract rational numbers.	Lesson 5-2	
<b>7. NS. 2</b>	Apply and extend previous understandings of multiplication and division and of fractions to multiply and divide rational numbers.		
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 by describing real-world contexts.	Lesson 2-3	
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.	Lessons 2-3, 5-1	
c.	Apply properties of operations as strategies to multiply and divide rational numbers.	Lessons 2-3, 5-3	
d.	Convert a rational number to a decimal using long division; know that the decimal form of a rational number terminates in 0s or eventually repeats.	Lessons 5-1, 5-2, 7-1	
<b>7. NS. 3</b>	Solve real-world and mathematical problems involving the four operations with rational numbers.	Lessons 1-4, 2-2, 2-3, 2-4, 5-2	Lessons 1-3, 2-4

## 7<sup>th</sup> Grade Course

### Expressions and Equations

**Use properties of operations to generate equivalent expressions.**

Code	Standards	Pre-Algebra Lessons	Algebra 1 Lessons
<b>7. EE. 1</b>	Apply properties of operations as strategies to add, subtract, factor, and expand linear expressions with rational coefficients.	Lessons 3-2, 3-5, 3-6	Lessons 1-2, 2-2
<b>7. EE. 2</b>	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.	Lesson 3-5	

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

Code	Standards	Pre-Algebra Lessons	Algebra 1 Lessons
<b>7. EE. 3</b>	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.	Lessons 2-4, 5-4	
<b>7. EE. 4</b>	Use variables to represent quantities in a real-world or mathematical problem, and construct simple equations and inequalities to solve problems by reasoning about the quantities.		
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.	Lesson 4-2	Lesson 2-2
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.	Lessons 4-3, 4-5	Lesson 3-1

## 8<sup>th</sup> Grade Course

### The Number System

**Know that there are numbers that are not rational, and approximate them by rational numbers.**

Code	Standards	Pre-Algebra Lessons	Algebra 1 Lessons
<b>8. NS. 1</b>	Know that numbers that are not rational are called irrational. Understand informally that every number has a decimal expansion; for rational numbers show that the decimal expansion repeats eventually, and convert a decimal expansion which repeats eventually into a rational number.	Lessons 8-1, 8-2	
<b>8. NS. 2</b>	Use rational approximations of irrational numbers to compare the size of irrational numbers, locate them approximately on a number line diagram, and estimate the value of expressions.	Lessons 8-1, 8-2	

### Expressions and Equations

**Work with radicals and integer exponents.**

Code	Standards	Pre-Algebra Lessons	Algebra 1 Lessons
<b>8. EE. 1</b>	Know and apply the properties of integer exponents to generate equivalent numerical expressions.	Lessons 2-4, 3-4, 5-3	Lessons 1-1, 6-1, 6-2, 6-3, 6-6
<b>8. EE. 2</b>	Use square root and cube root symbols to represent solutions to equations of the form $x^2 = p$ and $x^3 = p$ , where $p$ is a positive rational number. Evaluate square roots of small perfect squares and cube roots of small perfect cubes. Know that $\sqrt{2}$ is irrational.	Lessons 8-1, 8-2	Lesson 9-5
<b>8. EE. 3</b>	Use numbers expressed in the form of a single digit times an integer power of 10 to estimate very large or very small quantities, and to express how many times as much one is than the other.		Lessons 6-3, 6-4
<b>8. EE. 4</b>	Perform operations with numbers expressed in scientific notation, including problems where both decimal and scientific notation are used. Use scientific notation and choose units of appropriate size for measurements of very large or very small quantities. Interpret scientific notation that has been generated by technology.		Lesson 6-4

## 8<sup>th</sup> Grade Course

### Understand the connections between proportional relationships, lines, and linear equations.

Code	Standards	Pre-Algebra Lessons	Algebra 1 Lessons
<b>8. EE. 5</b>	Graph proportional relationships, interpreting the unit rate as the slope of the graph. Compare two different proportional relationships represented in different ways.		Lesson 4-3
<b>8. EE. 6</b>	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 $b$ .	Lessons 9-4, 9-5	Lessons 4-2, 4-3, 4-4

### Analyze and solve linear equations and pairs of simultaneous linear equations.

Code	Standards	Pre-Algebra Lessons	Algebra 1 Lessons
<b>8. EE. 7</b>	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).	Lessons 4-1, 4-2, 9-3, 9-5	Lessons 1-3, 2-1, 2-2, 2-3, 4-4
b.	Solve linear equations with rational number coefficients, including equations whose solutions require expanding expressions using the distributive property and collecting like terms.	Lessons 4-2, 5-4	Lessons 2-3, 2-5
<b>8. EE. 8</b>	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.		Lesson 5-1
b.	Solve systems of two linear equations in two variables algebraically, and estimate solutions by graphing the equations. Solve simple cases by inspection.		Lessons 5-1, 5-2, 5-3
c.	Solve real-world and mathematical problems leading to two linear equations in two variables.		Lessons 5-2, 5-3

## 8<sup>th</sup> Grade Course

### Functions

**Define, evaluate, and compare functions.**

Code	Standards	Pre-Algebra Lessons	Algebra 1 Lessons
<b>8. F. 1</b>	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.	Lessons 9-2, 9-5	Lessons 1-5, 4-3, 4-4, 6-6
<b>8. F. 2</b>	Compare properties of two functions each represented in a different way (algebraically, graphically, numerically in tables, or by verbal descriptions).		Lesson 4-2
<b>8. F. 3</b>	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.	Lesson 9-5	Lessons 4-1, 4-4, 4-5

**Use functions to model relationships between quantities.**

Code	Standards	Pre-Algebra Lessons	Algebra 1 Lessons
<b>8. F. 4</b>	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.	Lessons 9-3, 9-4, 9-5	Lessons 4-1, 4-2, 4-3, 4-4, 4-5, 4-6
<b>8. F. 5</b>	Describe qualitatively the functional relationship between two quantities by analyzing a graph. Sketch a graph that exhibits the qualitative features of a function that has been described verbally.	Lessons 9-3, 9-5	Lesson 4-4

Need more information? We're happy to help!

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