

## 7<sup>th</sup> Grade Pacing Guide

### Unit 1 Algebraic Expressions and Integers

**Total Number of Instructional Days 20**

	Common Core Standard Covered	Major Topics/Concepts	Number of days
<b>1-1</b>	<b>Place Value</b>  CCSS.MATH.CONTENT.6.NS.C.7	<ul style="list-style-type: none"> <li>Understand ordering and absolute value of rational numbers.</li> </ul>	<b>1</b>
<b>1-2</b>	<b>Variables and Expressions</b>  CCSS.MATH.CONTENT.6.EE.A.2.A CCSS.MATH.CONTENT.6.EE.A.2.C CCSS.MATH.CONTENT.6.EE.B.6 CCSS.MATH.CONTENT.6.EE.C.9 CCSS.MATH.CONTENT.7.EE.B.4 CCSS.MATH.CONTENT.8.EE.A.1	<ul style="list-style-type: none"> <li>Write, read, and evaluate expressions in which letters stand for numbers.</li> <li>Evaluate expressions at specific values of their variables. Include expressions that arise from formulas used in real-world problems.</li> <li>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.</li> <li>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.</li> <li>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.</li> <li>Know and apply the properties of integer exponents to generate equivalent numerical expressions.</li> </ul>	<b>2</b>

**1-3 The Order of Operations**

CCSS.MATH.CONTENT.6.EE.A.2.C  
CCSS.MATH.CONTENT.6.EE.A.3  
CCSS.MATH.CONTENT.7.EE.A.1  
CCSS.MATH.CONTENT.7.NS.A.3  
CCSS.MATH.CONTENT.7.NS.A.1.D

- Evaluate expressions at specific values of their variables. Include expressions that arise from formulas used in real-world problems. Perform arithmetic operations, including those involving whole-number exponents, in the conventional order when there are no parentheses to specify a particular order (Order of Operations).
- Apply the properties of operations to generate equivalent expressions.
- Apply properties of operations as strategies to add, subtract, factor, and expand linear expressions with rational coefficients.
- Solve real-world and mathematical problems involving the four operations with rational numbers.

**2****1-4 Writing and Evaluating Expressions**

CCSS.MATH.CONTENT.6.EE.A.1  
CCSS.MATH.CONTENT.6.EE.A.2  
CCSS.MATH.CONTENT.6.EE.A.3  
CCSS.MATH.CONTENT.6.EE.A.4  
CCSS.MATH.CONTENT.7.EE.A.1  
CCSS.MATH.CONTENT.8.EE.A.1

- Write and evaluate numerical expressions involving whole-number exponents.
- Write, read, and evaluate expressions in which letters stand for numbers.
- Apply the properties of operations to generate equivalent 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).
- Apply properties of operations as strategies to add, subtract, factor, and expand linear expressions with rational coefficients.
- Know and apply the properties of integer exponents to generate equivalent numerical expressions.

**2****1-5 Integers and Absolute Value**

CCSS.MATH.CONTENT.6.NS.C.7  
CCSS.MATH.CONTENT.6.NS.C.7.C  
CCSS.MATH.CONTENT.6.NS.C.7.D

- Understand ordering and absolute value 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.
- Distinguish comparisons of absolute value from statements about order.

**2**

## 1-6 Adding Integers

CCSS.MATH.CONTENT.6.NS.B.3  
CCSS.MATH.CONTENT.7.NS.A.1

- Fluently add, subtract, multiply, and divide multi-digit decimals using the standard algorithm for each operation.
- 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.

2

## 1-7 Subtracting Integers

CCSS.MATH.CONTENT.6.NS.B.3  
CCSS.MATH.CONTENT.7.NS.A.1  
CCSS.MATH.CONTENT.7.NS.A.1.D

- Fluently add, subtract, multiply, and divide multi-digit decimals using the standard algorithm for each operation.
- 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.
- Apply properties of operations as strategies to add and subtract rational numbers.

2

## 1-8 Problem Solving: Rounding and Estimating

CCSS.MATH.CONTENT.7.EE.B.3  
CCSS.MATH.CONTENT.8.EE.A.3  
CCSS.MATH.CONTENT.8.EE.C.8.B  
CCSS.MATH.CONTENT.8.NS.A.2

- 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.
- 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.
- Solve systems of two linear equations in two variables algebraically, and estimate solutions by graphing the equations. Solve simple cases by inspection.
- Use rational approximations of irrational numbers to compare the size of irrational numbers, locate them approximately on a number line diagram, and estimate the value of expressions (e.g.,  $\pi^2$ ).

1

<b>1-9</b>	<b>Inductive Reasoning</b> CCSS.MATH.PRACTICE.MP2 CCSS.MATH.PRACTICE.MP2	<ul style="list-style-type: none"> <li>Reason abstractly and quantitatively.</li> <li>Construct viable arguments and critique the reasoning of others.</li> </ul>	<b>1</b>
<b>1-10</b>	<b>Patterns</b> CCSS.MATH.CONTENT.8.SP.A.1 CCSS.MATH.CONTENT.8.SP.A.4	<ul style="list-style-type: none"> <li>Construct and interpret scatter plots for bivariate measurement data to investigate patterns of association between two quantities. Describe patterns such as clustering, outliers, positive or negative association, linear association, and nonlinear association.</li> <li>Understand that patterns of association can also be seen in bivariate categorical data by displaying frequencies and relative frequencies in a two-way table. Construct and interpret a two-way table summarizing data on two categorical variables collected from the same subjects. Use relative frequencies calculated for rows or columns to describe possible association between the two variables.</li> </ul>	<b>1</b>
<b>1-11</b>	<b>Multiplying and Dividing Integers</b> CCSS.MATH.CONTENT.6.NS.B.2 CCSS.MATH.CONTENT.6.NS.B.3 CCSS.MATH.CONTENT.7.NS.A.2 CCSS.MATH.CONTENT.7.NS.A.2.D CCSS.MATH.CONTENT.7.NS.A.2.A	<ul style="list-style-type: none"> <li>Fluently divide multi-digit numbers using the standard algorithm.</li> <li>Fluently add, subtract, multiply, and divide multi-digit decimals using the standard algorithm for each operation.</li> <li>Apply and extend previous understandings of multiplication and division and of fractions to multiply and divide rational numbers.</li> <li>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 <math>(-1)(-1) = 1</math> and the rules for multiplying signed numbers. Interpret products of rational numbers by describing real-world contexts.</li> <li>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.</li> </ul>	<b>2</b>

**1-12 The Coordinate Plane**

CCSS.MATH.CONTENT.6.NS.C.6  
CCSS.MATH.CONTENT.6.NS.C.6.B  
CCSS.MATH.CONTENT.6.NS.C.6.C  
CCSS.MATH.CONTENT.6.NS.C.8

- 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.
- Understand signs of numbers in ordered pairs as indicating locations in quadrants of the coordinate plane; recognize that when two ordered pairs differ only by signs, the locations of the points are related by reflections across one or both axes.
- Find and position integers and other rational numbers on a horizontal or vertical number line diagram; find and position pairs of integers and other rational numbers on a coordinate plane.
- Solve real-world and mathematical problems by graphing points in all four quadrants of 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.

**2**

## Unit 2 - Solving One-Step Equations and Inequalities

**Total Number of Instructional Days 18**

	Common Core Standard Covered	Major Topics/Concepts	Number of days
<b>2-1</b>	<b>Properties of Numbers</b> CCSS.MATH.CONTENT.6.NS.C.5 CCSS.MATH.CONTENT.6.NS.C.6 CCSS.MATH.CONTENT.7.NS.A.2.A CCSS.MATH.CONTENT.8.NS.A.1	<ul style="list-style-type: none"> <li>Understand that positive and negative numbers are used together to describe quantities having opposite directions or values; use positive and negative numbers to represent quantities in real-world contexts, explaining the meaning of 0 in each situation.</li> <li>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.</li> <li>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 <math>(-1)(-1) = 1</math> and the rules for multiplying signed numbers. Interpret products of rational numbers by describing real-world contexts.</li> <li>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.</li> </ul>	<b>2</b>
<b>2-2</b>	<b>The Distributive Property</b> CCSS.MATH.CONTENT.6.NS.B.4 CCSS.MATH.CONTENT.7.NS.A.2.A CCSS.MATH.CONTENT.8.EE.C.7.B	<ul style="list-style-type: none"> <li>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.</li> <li>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 <math>(-1)(-1) = 1</math> and the rules for multiplying signed numbers. Interpret products of rational numbers by describing real-world contexts.</li> <li>Solve linear equations with rational number coefficients.</li> </ul>	<b>1</b>

**2-3 Simplifying Variable Expressions**

CCSS.MATH.CONTENT.6.EE.A.2.C  
CCSS.MATH.CONTENT.6.EE.A.3  
CCSS.MATH.CONTENT.6.EE.A.4  
CCSS.MATH.CONTENT.6.EE.B.6  
CCSS.MATH.CONTENT.7.EE.A.1  
CCSS.MATH.CONTENT.7.EE.A.2  
CCSS.MATH.CONTENT.7.EE.B.4

- Evaluate expressions at specific values of their variables. Include expressions that arise from formulas used in real-world problems. Perform arithmetic operations, including those involving whole-number exponents, in the conventional order when there are no parentheses to specify a particular order (Order of Operations).
- Apply the properties of operations to generate equivalent expressions.
- Identify when two expressions are equivalent
- Apply properties of operations as strategies to add, subtract, factor, and expand linear expressions with rational coefficients.
- 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.
- 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.

**2****2-4 Variables and Equations**

CCSS.MATH.CONTENT.6.EE.B.6  
CCSS.MATH.CONTENT.6.EE.B.7  
CCSS.MATH.CONTENT.6.EE.C.9  
CCSS.MATH.CONTENT.7.EE.B.4

- 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.
- 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.
- 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.
- 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.

**2**

**2-5 Solving Equations by Adding or Subtracting**

CCSS.MATH.CONTENT.6.EE.B.5

CCSS.MATH.CONTENT.6.EE.B.7

CCSS.MATH.CONTENT.6.EE.C.9

CCSS.MATH.CONTENT.7.EE.B.4

CCSS.MATH.CONTENT.8.EE.C.7

- Understand solving an equation as a process of answering a question: which values from a specified set, if any, make the equation or inequality true.
- 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.
- 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.
- Use variables to represent quantities in a real-world or mathematical problem, and construct simple equations to solve problems by reasoning about the quantities.
- Solve linear equations in one variable.

**2****2-6 Solving Equations by Multiplying or Dividing**

CCSS.MATH.CONTENT.6.EE.B.5

CCSS.MATH.CONTENT.6.EE.B.7

CCSS.MATH.CONTENT.6.EE.C.9

CCSS.MATH.CONTENT.7.EE.B.4

CCSS.MATH.CONTENT.8.EE.C.7

- Understand solving an equation as a process of answering a question: which values from a specified set, if any, make the equation or inequality true. Use substitution to determine whether a given number in a specified set makes an equation or inequality true.
- 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.
- 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.
- Use variables to represent quantities in a real-world or mathematical problem, and construct simple equations to solve problems by reasoning about the quantities.
- Solve linear equations in one variable.

**2**



2-7	<b>Guess, Check, and Revise</b> CCSS.MATH.CONTENT.7.EE.B.4 CCSS.MATH.CONTENT.7.RP.A.1 CCSS.MATH.PRACTICE.MP5 CCSS.MATH.PRACTICE.MP7	<ul style="list-style-type: none"> <li>• 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.</li> <li>• Recognize and represent proportional relationships between quantities.</li> <li>• Use appropriate tools strategically and look for and make use of structure.</li> </ul>	1
2-8	<b>Inequalities and Their Graphs</b> CCSS.MATH.CONTENT.7.EE.B.4 CCSS.MATH.CONTENT.7.EE.B.4.B	<ul style="list-style-type: none"> <li>• 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.</li> <li>• Solve word problems leading to inequalities of the form <math>px + q &gt; r</math> or <math>px + q &lt; r</math>, where <math>p</math>, <math>q</math>, and <math>r</math> are specific rational numbers. Graph the solution set of the inequality and interpret it in the context of the problem.</li> </ul>	2
2-9	<b>Solving One-Step Inequalities by Adding or Subtracting</b> CCSS.MATH.CONTENT.6.EE.B.5 CCSS.MATH.CONTENT.6.EE.B.8 CCSS.MATH.CONTENT.7.EE.B.4.B	<ul style="list-style-type: none"> <li>• Understand solving an inequality as a process of answering a question: which values from a specified set, if any, make the equation or inequality true?</li> <li>• Write an inequality of the form <math>x &gt; c</math> or <math>x &lt; c</math> to represent a constraint or condition in a real-world or mathematical problem. Recognize that inequalities of the form <math>x &gt; c</math> or <math>x &lt; c</math> have infinitely many solutions; represent solutions of such inequalities on number line diagrams.</li> <li>• Solve word problems leading to inequalities of the form <math>px + q &gt; r</math> or <math>px + q &lt; r</math>, where <math>p</math>, <math>q</math>, and <math>r</math> are specific rational numbers.</li> </ul>	2
2-10	<b>Solving One-Step Inequalities by Multiplying or Dividing</b> CCSS.MATH.CONTENT.6.EE.B.5 CCSS.MATH.CONTENT.6.EE.B.8 CCSS.MATH.CONTENT.7.EE.B.4.B	<ul style="list-style-type: none"> <li>• Understand solving an inequality as a process of answering a question: which values from a specified set, if any, make the equation or inequality true?</li> <li>• Write an inequality of the form <math>x &gt; c</math> or <math>x &lt; c</math> to represent a constraint or condition in a real-world or mathematical problem. Recognize that inequalities of the form <math>x &gt; c</math> or <math>x &lt; c</math> have infinitely many solutions; represent solutions of such inequalities on number line diagrams.</li> <li>• Solve word problems leading to inequalities of the form <math>px + q &gt; r</math> or <math>px + q &lt; r</math>, where <math>p</math>, <math>q</math>, and <math>r</math> are specific rational numbers. Graph the solution set of the inequality and interpret it in the context of the problem.</li> </ul>	2

## Unit 3 - Decimals and Equations

Total Number of Instructional Days 10

Common Core Standard Covered	Major Topics/Concepts	Number of days
<b>3-1 Rounding and Estimating</b>  CCSS.MATH.CONTENT.7.EE.B.3 CCSS.MATH.CONTENT.8.EE.A.3 CCSS.MATH.CONTENT.8.EE.C.8.B CCSS.MATH.CONTENT.8.NS.A.2	<ul style="list-style-type: none"> <li>Solve multi-step real-life and mathematical problems posed with positive and negative rational numbers in any, 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.</li> <li>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.</li> <li>Solve systems of two linear equations in two variables algebraically, and estimate solutions by graphing the equations. Solve simple cases by inspection.</li> <li>Use rational approximations of irrational numbers to compare the size of irrational numbers, locate them approximately on a number line diagram, and estimate the value of expressions (e.g., <math>\pi^2</math>).</li> </ul>	2
<b>3-2 Estimating Decimal Products and Quotients</b>  CCSS.MATH.CONTENT.7.NS.A.2.A CCSS.MATH.CONTENT.7.NS.A.2.B	<ul style="list-style-type: none"> <li>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 <math>(-1)(-1) = 1</math> and the rules for multiplying signed numbers. Interpret products of rational numbers by describing real-world contexts.</li> <li>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 <math>p</math> and <math>q</math> are integers, then <math>-(p/q) = (-p)/q = p/(-q)</math>. Interpret quotients of rational numbers by describing real-world contexts.</li> </ul>	1

**3-3 Mean, Median, and Mode**

CCSS.MATH.CONTENT.6.SP.B.5.C

CCSS.MATH.CONTENT.7.SP.B.3

CCSS.MATH.CONTENT.7.SP.B.4

- 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.
- Informally assess the degree of visual overlap of two numerical data distributions with similar variability, measuring the difference between the centers by expressing it as a multiple of a measure of variability.
- Use measures of center and measures of variability for numerical data from random samples to draw informal comparative inferences about two populations.

1

**3-4 Using Formulas**

CCSS.MATH.CONTENT.6.EE.A.2.C

CCSS.MATH.CONTENT.6.G.A.2

CCSS.MATH.CONTENT.6.RP.A.3.B

CCSS.MATH.CONTENT.7.G.B.4

- Evaluate expressions at specific values of their variables. Include expressions that arise from formulas used in real-world problems.
- 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.
- Solve unit rate problems including those involving unit pricing and constant speed.
- Know the formulas for the area and circumference of a circle and use them to solve problems;

1

## 3-5 Solving Equations by Adding or Subtracting Decimals

CCSS.MATH.CONTENT.6.EE.B.5  
 CCSS.MATH.CONTENT.6.EE.B.7  
 CCSS.MATH.CONTENT.7.EE.B.4.A  
 CCSS.MATH.CONTENT.8.EE.C.7  
 CCSS.MATH.CONTENT.8.EE.C.7.B

- Understand solving an equation or inequality as a process of answering a question: which values from a specified set, if any, make the equation or inequality true.
- 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.
- 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.
- Solve linear equations in one variable and solve linear equations with rational number coefficients, including equations whose solutions require expanding expressions using the distributive property and collecting like terms.

2

## 3-6 Solving Equations by Multiplying or Dividing Decimals

CCSS.MATH.CONTENT.6.EE.B.5  
 CCSS.MATH.CONTENT.6.EE.B.7  
 CCSS.MATH.CONTENT.7.EE.B.4.A  
 CCSS.MATH.CONTENT.8.EE.C.7  
 CCSS.MATH.CONTENT.8.EE.C.7.B

- Understand solving an equation or inequality as a process of answering a question: which values from a specified set, if any, make the equation or inequality true?
- 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.
- 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.
- Solve linear equations in one variable and solve linear equations with rational number coefficients, including equations whose solutions require expanding expressions using the distributive property and collecting like terms.

2

## 3-7 Using the Metric System

CCSS.MATH.CONTENT.6.RP.A.3.D

Use ratio reasoning to convert measurement units; manipulate and transform units appropriately when multiplying or dividing quantities.

1

## Unit 4 - Factors, Fractions, And Exponents

Total Number of Instructional Days **13**

Common Core Standard Covered	Major Topics/Concepts	Number of days
<b>4-1 Divisibility and Factors</b> CCSS.MATH.CONTENT.6.EE.A.2.B CCSS.MATH.CONTENT.6.NS.B.2 CCSS.MATH.CONTENT.6.NS.B.4	<ul style="list-style-type: none"> <li>Identify parts of an expression using mathematical terms; view one or more parts of an expression as a single entity.</li> <li>Fluently divide multi-digit numbers using the standard algorithm.</li> <li>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.</li> </ul>	2
<b>4-2 Exponents</b> CCSS.MATH.CONTENT.6.EE.A.1 CCSS.MATH.CONTENT.6.EE.A.2.C CCSS.MATH.CONTENT.8.EE.A.1	<ul style="list-style-type: none"> <li>Write and evaluate numerical expressions involving whole-number exponents.</li> <li>Evaluate expressions at specific values of their variables. Include expressions that arise from formulas used in real-world problems. Perform arithmetic operations, including those involving whole-number exponents, in the conventional order when there are no parentheses to specify a particular order (Order of Operations).</li> <li>Know and apply the properties of integer exponents to generate equivalent numerical expressions.</li> </ul>	1
<b>4-3 Prime Factorization and Greatest Common Factor</b> CCSS.MATH.CONTENT.6.NS.B.4	<ul style="list-style-type: none"> <li>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.</li> </ul>	1
<b>4-4 Simplifying Fractions</b> CCSS.MATH.CONTENT.6.NS.A.1	<ul style="list-style-type: none"> <li>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.</li> </ul>	2

**4-5 Rational Numbers**

CCSS.MATH.CONTENT.6.NS.C.6

CCSS.MATH.CONTENT.6.NS.C.7.B

CCSS.MATH.CONTENT.6.NS.C.7

CCSS.MATH.CONTENT.7.NS.A.1

CCSS.MATH.CONTENT.7.NS.A.1.A

CCSS.MATH.CONTENT.7.NS.A.1.B

CCSS.MATH.CONTENT.7.NS.A.1.C

CCSS.MATH.CONTENT.7.NS.A.1.D

CCSS.MATH.CONTENT.7.NS.A.3

- Find and position integers and other rational numbers on a horizontal or vertical number line diagram; find and position pairs of integers and other rational numbers on a coordinate plane.
- Understand ordering and absolute value of rational numbers.
- Write, interpret, and explain statements of order for rational numbers in real-world contexts.
- 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.
- Describe situations in which opposite quantities combine to make 0. For example, a hydrogen atom has 0 charge because its two constituents are oppositely charged.
- 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.
- 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.
- Apply properties of operations as strategies to add and subtract rational numbers.
- Solve real-world and mathematical problems involving the four operations with rational numbers.

**2**

<b>4-6 Irrational Numbers</b> CCSS.MATH.CONTENT.8.NS.A.1 CCSS.MATH.CONTENT.8.NS.A.2	<ul style="list-style-type: none"> <li>• 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.</li> <li>• Use rational approximations of irrational numbers to compare the size of irrational numbers, locate them approximately on a number line diagram, and estimate the value of expressions (e.g., <math>\pi^2</math>).</li> </ul>	<b>2</b>
<b>4-7 Exponents and Multiplication</b> CCSS.MATH.CONTENT.8.EE.A.1 CCSS.MATH.CONTENT.8.EE.A.2	<ul style="list-style-type: none"> <li>• Know and apply the properties of integer exponents to generate equivalent numerical expressions.</li> <li>• Use square root and cube root symbols to represent solutions to equations of the form <math>x^2 = p</math> and <math>x^3 = p</math>, where <math>p</math> is a positive rational number. Evaluate square roots of small perfect squares and cube roots of small perfect cubes. Know that <math>\sqrt{2}</math> is irrational.</li> </ul>	<b>1</b>
<b>4-8 Exponents and Division</b> CCSS.MATH.CONTENT.8.EE.A.1 CCSS.MATH.CONTENT.8.EE.A.2	<ul style="list-style-type: none"> <li>• Know and apply the properties of integer exponents to generate equivalent numerical expressions.</li> <li>• Use square root and cube root symbols to represent solutions to equations of the form <math>x^2 = p</math> and <math>x^3 = p</math>, where <math>p</math> is a positive rational number. Evaluate square roots of small perfect squares and cube roots of small perfect cubes. Know that <math>\sqrt{2}</math> is irrational.</li> </ul>	<b>1</b>
<b>4-9 Scientific Notation</b> CCSS.MATH.CONTENT.8.EE.A.3 CCSS.MATH.CONTENT.8.EE.A.4	<ul style="list-style-type: none"> <li>• 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.</li> <li>• Perform operations with numbers expressed in scientific notation, including problems where both decimal and scientific notation are used. Use scientific notation and choose units of appropriate size for measurements of very large or very small quantities (e.g., use millimeters per year for seafloor spreading). Interpret scientific notation that has been generated by technology</li> </ul>	<b>1</b>

## Unit 5 - Operations with Fractions

**Total Number of Instructional Days    14**

Common Core Standard Covered	Major Topics/Concepts	Number of days
<b>5-1    Comparing and Ordering Rational Numbers</b>  CCSS.MATH.CONTENT.6.NS.C.7 CCSS.MATH.CONTENT.6.NS.C.7.B CCSS.MATH.CONTENT.6.NS.C.7.C CCSS.MATH.CONTENT.6.NS.C.7.D CCSS.MATH.CONTENT.7.NS.A.2	<ul style="list-style-type: none"> <li>• Understand ordering and absolute value of rational numbers.</li> <li>• Write, interpret, and explain statements of order for rational numbers in real-world contexts.</li> <li>• 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.</li> <li>• Distinguish comparisons of absolute value from statements about order.</li> <li>• Apply and extend previous understandings of multiplication and division and of fractions to multiply and divide rational numbers.</li> </ul>	1
<b>5-2    Fractions and Decimals</b>  CCSS.MATH.CONTENT.7.NS.A.2.D CCSS.MATH.CONTENT.7.RP.A.1	<ul style="list-style-type: none"> <li>• 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.</li> <li>• Compute unit rates associated with ratios of fractions, including ratios of lengths, areas and other quantities measured in like or different units.</li> </ul>	2
<b>5-3    Adding and Subtracting Fractions</b> CCSS.MATH.CONTENT.7.NS.A.1 CCSS.MATH.CONTENT.7.NS.A.1.C CCSS.MATH.CONTENT.7.NS.A.1.D	<ul style="list-style-type: none"> <li>• 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.</li> <li>• Understand subtraction of rational numbers as adding the additive inverse, <math>p - q = p + (-q)</math>. 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.</li> <li>• Apply properties of operations as strategies to add and subtract rational numbers.</li> </ul>	2



<b>5-4</b>	<b>Multiplying and Dividing Fractions</b>	<ul style="list-style-type: none"> <li>• Apply and extend previous understandings of multiplication and division and of fractions to multiply and divide rational numbers.</li> <li>• 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 <math>(-1)(-1) = 1</math> and the rules for multiplying signed numbers. Interpret products of rational numbers by describing real-world contexts.</li> <li>• 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 <math>p</math> and <math>q</math> are integers, then <math>-(p/q) = (-p)/q = p/(-q)</math>. Interpret quotients of rational numbers by describing real-world contexts.</li> </ul>	<b>2</b>
CCSS.MATH.CONTENT.7.NS.A.2 CCSS.MATH.CONTENT.7.NS.A.2.A CCSS.MATH.CONTENT.7.NS.A.2.B			
<b>5-5</b>	<b>Using Customary Units of Measurements</b>	<ul style="list-style-type: none"> <li>• Use ratio reasoning to convert measurement units; manipulate and transform units appropriately when multiplying or dividing quantities.</li> </ul>	<b>2</b>
CCSS.MATH.CONTENT.6.RP.A.3.D			
<b>5-6</b>	<b>Solving Equations by Adding or Subtracting Fractions</b>	<ul style="list-style-type: none"> <li>• Understand solving an equation as a process of answering a question: which values from a specified set, if any, make the equation or inequality true?</li> <li>• Solve real-world and mathematical problems by writing and solving equations of the form <math>x + p = q</math> and <math>px = q</math> for cases in which <math>p</math>, <math>q</math> and <math>x</math> are all nonnegative rational numbers.</li> <li>• Solve word problems leading to equations of the form <math>px + q = r</math> and <math>p(x + q) = r</math>, where <math>p</math>, <math>q</math>, and <math>r</math> 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.</li> <li>• Give examples of linear equations in one variable with one solution, infinitely many solutions, or no solutions. Show which of these</li> </ul>	<b>2</b>
CCSS.MATH.CONTENT.6.EE.B.5 CCSS.MATH.CONTENT.6.EE.B.7 CCSS.MATH.CONTENT.7.EE.B.4.B CCSS.MATH.CONTENT.8.EE.C.7.A CCSS.MATH.CONTENT.8.EE.C.7.B			

**5-7 Solving Equations by Multiplying Fractions**

CCSS.MATH.CONTENT.6.EE.B.5  
CCSS.MATH.CONTENT.6.EE.B.8  
CCSS.MATH.CONTENT.7.EE.B.4.B  
CCSS.MATH.CONTENT.8.EE.C.7.A  
CCSS.MATH.CONTENT.8.EE.C.7.B

- 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).
- Solve linear equations with rational number coefficients, including equations whose solutions require expanding expressions using the distributive property and collecting like terms.
- Understand solving an equation or inequality as a process of answering a question: which values from a specified set, if any, make the equation or inequality true?
- 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.
- 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.
- 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).
- Solve linear equations with rational number coefficients, including equations whose solutions require expanding expressions using the distributive property and collecting like terms.

**2**

**5-8 Powers of Products and Quotients**

CCSS.MATH.CONTENT.8.EE.A.3

CCSS.MATH.CONTENT.8.EE.A.2

- Use square root and cube root symbols to represent solutions to equations of the form  $x^2 = p$  and  $x^3 = p$ , where  $p$  is a positive rational number. Evaluate square roots of small perfect squares and cube roots of small perfect cubes. Know that  $\sqrt{2}$  is irrational.
- 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.

**1**

## Unit 6 - Ratios, Proportions, and Percentages

Total Number of Instructional Days 16

Common Core Standard Covered	Major Topics/Concepts	Number of days
<b>6-1 Ratios and Unit Rates</b>  CCSS.MATH.CONTENT.6.RP.A.1 CCSS.MATH.CONTENT.6.RP.A.2 CCSS.MATH.CONTENT.6.RP.A.3 CCSS.MATH.CONTENT.6.RP.A.3.B CCSS.MATH.CONTENT.7.RP.A.1 CCSS.MATH.CONTENT.8.EE.B.5	<ul style="list-style-type: none"> <li>• Understand the concept of a ratio and use ratio language to describe a ratio relationship between two quantities.</li> <li>• Understand the concept of a unit rate <math>a/b</math> associated with a ratio <math>a:b</math> with <math>b \neq 0</math>, and use rate language in the context of a ratio relationship.</li> <li>• 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.</li> <li>• Solve unit rate problems including those involving unit pricing and constant speed.</li> <li>• Compute unit rates associated with ratios of fractions, including ratios of lengths, areas and other quantities measured in like or different units.</li> <li>• Graph proportional relationships, interpreting the unit rate as the slope of the graph.</li> </ul>	2
<b>6-2 Proportions</b>  CCSS.MATH.CONTENT.7.RP.A.2 CCSS.MATH.CONTENT.7.RP.A.2.A CCSS.MATH.CONTENT.7.RP.A.2.B CCSS.MATH.CONTENT.7.RP.A.2.C CCSS.MATH.CONTENT.7.RP.A.3 CCSS.MATH.CONTENT.8.EE.B.5	<ul style="list-style-type: none"> <li>• Recognize and represent proportional relationships between quantities.</li> <li>• 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.</li> <li>• Identify the constant of proportionality (unit rate) in tables, graphs, equations, diagrams, and verbal descriptions of proportional relationships.</li> <li>• Represent proportional relationships by equations.</li> <li>• Use proportional relationships to solve multistep ratio and percent problems: simple interest, tax, markups and markdowns, gratuities and commissions, fees, percent increase and decrease, percent error.</li> <li>• Graph proportional relationships, interpreting the unit rate as the slope of the graph.</li> </ul>	2

<b>6-3</b>	<b>Similar Figures and Scale Drawing</b>	<ul style="list-style-type: none"> <li>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.</li> <li>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.</li> </ul>	<b>2</b>
	CCSS.MATH.CONTENT.7.G.A.1 CCSS.MATH.CONTENT.8.G.A.4		
<b>6-4</b>	<b>Probability</b>	<ul style="list-style-type: none"> <li>Understand that the probability of a chance event is a 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 <math>\frac{1}{2}</math> indicates an event that is neither unlikely nor likely, and a probability near 1 indicates a likely event.</li> <li>Approximate the probability of a chance event by collecting data on the chance process that produces it and observing its long-run relative frequency, and predict the approximate relative frequency given the probability.</li> <li>Develop a probability model and use it to find probabilities of events. Compare probabilities from a model to observed frequencies; if the agreement is not good, explain possible sources of the discrepancy.</li> <li>Find probabilities of compound events using organized lists, tables, tree diagrams, and simulation.</li> </ul>	<b>2</b>
	CCSS.MATH.CONTENT.7.SP.C.5 CCSS.MATH.CONTENT.7.SP.C.6 CCSS.MATH.CONTENT.7.SP.C.7 CCSS.MATH.CONTENT.7.SP.C.8		
<b>6-5</b>	<b>Fractions, Decimals, and Percentages</b>	<ul style="list-style-type: none"> <li>Find a percent of a quantity as a rate per 100 (e.g., 30% of a quantity means <math>\frac{30}{100}</math> times the quantity); solve problems involving finding the whole, given a part and the percent.</li> <li>Solve multi-step real-life and mathematical problems posed with positive and negative rational numbers in any form, 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.</li> </ul>	<b>2</b>
	CCSS.MATH.CONTENT.6.RP.A.3.C CCSS.MATH.CONTENT.7.EE.B.3		

<b>6-6 Proportions and Percentages</b> CCSS.MATH.CONTENT.7.RP.A.3	<ul style="list-style-type: none"> <li>Use proportional relationships to solve multistep ratio and percent problems. Examples: simple interest, tax, markups and markdowns, gratuities and commissions, fees, percent increase and decrease, percent error.</li> </ul>	2
<b>6-7 Percentages and Equations</b> CCSS.MATH.CONTENT.6.RP.A.3.C CCSS.MATH.CONTENT.7.EE.B.3 CCSS.MATH.CONTENT.7.RP.A.3	<ul style="list-style-type: none"> <li>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.</li> <li>Solve multi-step real-life and mathematical problems posed with positive and negative rational numbers in any form, 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.</li> <li>Use proportional relationships to solve multistep ratio and percent problems. Examples: simple interest, tax, markups and markdowns, gratuities and commissions, fees, percent increase and decrease, percent error.</li> </ul>	1
<b>6-8 Percent of Change</b> CCSS.MATH.CONTENT.6.RP.A.3.C CCSS.MATH.CONTENT.7.RP.A.3	<ul style="list-style-type: none"> <li>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.</li> <li>Use proportional relationships to solve multistep ratio and percent problems. Examples: simple interest, tax, markups and markdowns, gratuities and commissions, fees, percent increase and decrease, percent error.</li> </ul>	1
<b>6-9 Markup and Discount</b> CCSS.MATH.CONTENT.7.RP.A.3	<ul style="list-style-type: none"> <li>Use proportional relationships to solve multistep ratio and percent problems. Examples: simple interest, tax, markups and markdowns, gratuities and commissions, fees, percent increase and decrease, percent error.</li> </ul>	1

**6-10 Tables**

CCSS.MATH.CONTENT.6.RP.A.3.A

CCSS.MATH.CONTENT.7.RP.A.2.A

CCSS.MATH.CONTENT.7.RP.A.2.B

- 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.
- 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.
- Identify the constant of proportionality (unit rate) in tables, graphs, equations, diagrams, and verbal descriptions of proportional relationships.

**1**

## Unit 7 - Solving Equations and Inequalities

Total Number of Instructional Days **14**

Common Core Standard Covered	Major Topics/Concepts	Number of days
<b>7-1 Solving Two-Step Equations</b>  CCSS.MATH.CONTENT.6.EE.B. CCSS.MATH.CONTENT.6.EE.B.6 CCSS.MATH.CONTENT.6.EE.B.7 CCSS.MATH.CONTENT.7.EE.B.4.A CCSS.MATH.CONTENT.8.EE.C.7 CCSS.MATH.CONTENT.8.EE.C.7.A CCSS.MATH.CONTENT.8.EE.A.2	<ul style="list-style-type: none"> <li>• Understand solving an equation or inequality as a process of answering a question: which values from a specified set, if any, make the equation or inequality true?</li> <li>• 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.</li> <li>• Solve real-world and mathematical problems by writing and solving equations of the form <math>x + p = q</math> and <math>px = q</math> for cases in which <math>p</math>, <math>q</math> and <math>x</math> are all nonnegative rational numbers.</li> <li>• Solve word problems leading to equations of the form <math>px + q = r</math> and <math>p(x + q) = r</math>, where <math>p</math>, <math>q</math>, and <math>r</math> 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.</li> <li>• Solve linear equations in one variable.</li> <li>• 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 <math>x = a</math>, <math>a = a</math>, or <math>a = b</math> results.</li> </ul>	2



**7-2 Solving Multi-Step Equations**

CCSS.MATH.CONTENT.6.EE.B.  
CCSS.MATH.CONTENT.6.EE.B.6  
CCSS.MATH.CONTENT.6.EE.B.7  
CCSS.MATH.CONTENT.7.EE.B.3  
CCSS.MATH.CONTENT.7.EE.B.4.A  
CCSS.MATH.CONTENT.8.EE.C.7  
CCSS.MATH.CONTENT.8.EE.C.7.A  
CCSS.MATH.CONTENT.8.EE.A.2

- Understand solving an equation or inequality as a process of answering a question: which values from a specified set, if any, make the equation or inequality true?
- Use 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.
- 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.
- Solve multi-step real-life and mathematical problems posed with positive and negative rational numbers in any form, 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.
- 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.
- Solve linear equations in one variable.
- 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.

**2**

**7-3 Multi-Step Equations with Fractions and Decimals**

CCSS.MATH.CONTENT.6.EE.B.  
CCSS.MATH.CONTENT.6.EE.B.6  
CCSS.MATH.CONTENT.6.EE.B.7  
CCSS.MATH.CONTENT.7.EE.B.3  
CCSS.MATH.CONTENT.7.EE.B.4.A  
CCSS.MATH.CONTENT.8.EE.C.7  
CCSS.MATH.CONTENT.8.EE.C.7.A  
CCSS.MATH.CONTENT.8.EE.A.2

- Understand solving an equation or inequality as a process of answering a question: which values from a specified set, if any, make the equation or inequality true?
- Use 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.
- 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.
- Solve multi-step real-life and mathematical problems posed with positive and negative rational numbers in any, 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.
- 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.
- Solve linear equations in one variable.
- 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.

**2**

**7-4 Write an Equation**

CCSS.MATH.CONTENT.6.EE.B.5  
CCSS.MATH.CONTENT.6.EE.B.6  
CCSS.MATH.CONTENT.6.EE.B.7  
CCSS.MATH.CONTENT.7.EE.B.3  
CCSS.MATH.CONTENT.7.EE.B.4  
CCSS.MATH.CONTENT.8.EE.C.7.A

- Understand solving an equation or inequality as a process of answering a question: which values from a specified set, if any, make the equation or inequality true?
- Use 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.
- 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.
- Solve multi-step real-life and mathematical problems posed with positive and negative rational numbers in any form, 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.
- 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.
- Solve linear equations in one variable.

**2****7-5 Solving Equations with Variables on Both Sides**

CCSS.MATH.CONTENT.6.EE.C.9  
CCSS.MATH.CONTENT.7.EE.B.4  
CCSS.MATH.CONTENT.8.EE.C.7.B

- 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.
- 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.
- Solve linear equations with rational number coefficients.

**2**

## 7-6 Solving Two-Step Inequalities

CCSS.MATH.CONTENT.6.EE.C.9  
CCSS.MATH.CONTENT.7.EE.B.4.B  
CCSS.MATH.CONTENT.7.EE.B.4

- 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.
- Use variables to represent quantities in a real-world or mathematical problem, and construct simple inequalities to solve problems by reasoning about the quantities.
- 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.

2

## 7-7 Transforming Formulas

CCSS.MATH.CONTENT.7.EE.B.4  
CCSS.MATH.CONTENT.7.EE.B.4.A  
CCSS.MATH.CONTENT.8.EE.C.7.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.
- 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.
- Solve linear equations with rational number coefficients, including equations whose solutions require expanding expressions using the distributive property and collecting like terms.

1

## 7-8 Simple and Compound Interest

CCSS.MATH.CONTENT.7.RP.A.3

- Use proportional relationships to solve multistep ratio and percent problems. Examples: simple interest, tax, markups and markdowns, gratuities and commissions, fees, percent increase and decrease, percent error.

1

## Unit 8 - Linear Functions and Graphing

Total Number of Instructional Days 12

	Common Core Standard Covered	Major Topics/Concepts	Number of days
8-1	<b>Relations and Functions</b> CCSS.MATH.CONTENT.8.F.A.1 CCSS.MATH.CONTENT.8.F.A.2 CCSS.MATH.CONTENT.8.F.A.3	<ul style="list-style-type: none"> <li>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.</li> <li>Compare properties of two functions each represented in a different way.</li> <li>Interpret the equation <math>y = mx + b</math> as defining a linear function, whose graph is a straight line.</li> </ul>	2
8-2	<b>Equations with Two Variables</b> CCSS.MATH.CONTENT.8.F.B.4 CCSS.MATH.CONTENT.8.F.B.5	<ul style="list-style-type: none"> <li>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 <math>(x, y)</math> 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.</li> <li>Describe qualitatively the functional relationship between two quantities by analyzing a graph (e.g., where the function is increasing or decreasing, linear or nonlinear). Sketch a graph that exhibits the qualitative features of a function that has been described verbally.</li> </ul>	2
8-3	<b>Slope and y-intercept</b> CCSS.MATH.CONTENT.8.EE.B.5 CCSS.MATH.CONTENT.8.EE.B.6 CCSS.MATH.CONTENT.8.SP.A.3 CCSS.MATH.CONTENT.8.SP.A.4	<ul style="list-style-type: none"> <li>Graph proportional relationships, interpreting the unit rate as the slope of the graph. Compare two different proportional relationships represented in different ways.</li> <li>Use similar triangles to explain why the slope <math>m</math> is the same between any two distinct points on a non-vertical line in the coordinate plane; derive the equation <math>y = mx</math> for a line through the origin and the equation <math>y = mx + b</math> for a line intercepting the vertical axis at <math>b</math>.</li> </ul>	1

<b>8-4</b>	<b>Writing Rules for Linear Functions</b>	<ul style="list-style-type: none"> <li>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.</li> <li>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.</li> </ul>	<b>1</b>
	CCSS.MATH.CONTENT.6.EE.C.9 CCSS.MATH.CONTENT.8.F.A.1		
<b>8-5</b>	<b>Scatter Plots</b>	<ul style="list-style-type: none"> <li>Construct and interpret scatter plots for bivariate measurement data to investigate patterns of association between two quantities.</li> <li>Know that straight lines are widely used to model relationships between two quantitative variables. For scatter plots that suggest a linear association, informally fit a straight line, and informally assess the model fit by judging the closeness of the data points to the line.</li> <li>Use the equation of a linear model to solve problems in the context of bivariate measurement data, interpreting the slope and intercept.</li> </ul>	<b>1</b>
	CCSS.MATH.CONTENT.8.SP.A.1 CCSS.MATH.CONTENT.8.SP.A.2 CCSS.MATH.CONTENT.8.SP.A.3		
<b>8-6</b>	<b>Solving Systems of Linear Equations by Graphing</b>	<ul style="list-style-type: none"> <li>Analyze and solve pairs of simultaneous linear equations.</li> <li>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.</li> <li>Solve real-world and mathematical problems leading to two linear equations in two variables.</li> </ul>	<b>1</b>
	CCSS.MATH.CONTENT.8.EE.C.8 CCSS.MATH.CONTENT.8.EE.C.8.A CCSS.MATH.CONTENT.8.EE.C.8.C		
<b>8-7</b>	<b>Solving Systems of Linear Equations by Substitution</b>	<ul style="list-style-type: none"> <li>Analyze and solve pairs of simultaneous linear equations.</li> <li>Solve systems of two linear equations in two variables algebraically, and estimate solutions by graphing the equations. Solve simple cases by inspection.</li> </ul>	<b>2</b>
	CCSS.MATH.CONTENT.8.EE.C.8 CCSS.MATH.CONTENT.8.EE.C.8.B		

**8-8 Graphing Linear Inequalities**

CCSS.MATH.CONTENT.7.EE.B.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.

**2**

## Unit 9 - Spatial Thinking

**Total Number of Instructional Days 14**

	Common Core Standard Covered	Major Topics/Concepts	Number of days
<b>9-1</b>	<b>Introduction to Geometry: Points, Lines, and Planes</b>  CCSS.MATH.CONTENT.7.G.A.1 CCSS.MATH.CONTENT.7.G.A.2	<ul style="list-style-type: none"> <li>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.</li> <li>Draw (freehand, with ruler and protractor, and with technology) geometric shapes with given conditions. Focus on constructing triangles from three measures of angles or sides, noticing when the conditions determine a unique triangle, more than one triangle, or no triangle.</li> </ul>	<b>1</b>
<b>9-2</b>	<b>Angle Relationships and Parallel Lines</b>  CCSS.MATH.CONTENT.7.G.A.1 CCSS.MATH.CONTENT.7.G.A.2 CCSS.MATH.CONTENT.7.G.B.5 CCSS.MATH.CONTENT.8.G.A.5	<ul style="list-style-type: none"> <li>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.</li> <li>Draw (freehand, with ruler and protractor, and with technology) geometric shapes with given conditions.</li> <li>Use facts about supplementary, complementary, vertical, and adjacent angles in a multi-step problem to write and solve simple equations for an unknown angle in a figure.</li> <li>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.</li> </ul>	<b>1</b>
<b>9-3</b>	<b>Classifying Polygon</b>  CCSS.MATH.CONTENT.6.G.A.3 CCSS.MATH.CONTENT.7.G.A.2	<ul style="list-style-type: none"> <li>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.</li> <li>Draw geometric shapes with given conditions. Focus on constructing triangles from three measures of angles or sides, noticing when the conditions determine a unique triangle, more than one triangle, or no triangle.</li> </ul>	<b>1</b>



<b>9-4</b>	<b>Draw a Diagram</b> CCSS.MATH.CONTENT.6.RP.A.3 CCSS.MATH.CONTENT.7.G.A.1	<ul style="list-style-type: none"> <li>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.</li> <li>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.</li> </ul>	<b>1</b>
<b>9-5</b>	<b>Congruence</b> CCSS.MATH.CONTENT.8.G.A.2	<ul style="list-style-type: none"> <li>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.</li> </ul>	<b>1</b>
<b>9-6</b>	<b>Circles</b> CCSS.MATH.CONTENT.7.G.B.4	<ul style="list-style-type: none"> <li>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.</li> </ul>	<b>1</b>
<b>9-7</b>	<b>Constructions</b> CCSS.MATH.CONTENT.7.G.A.1	<ul style="list-style-type: none"> <li>Draw (freehand, with ruler and protractor, and with technology) geometric shapes with given conditions. Focus on constructing triangles from three measures of angles or sides, noticing when the conditions determine a unique triangle, more than one triangle, or no triangle.</li> </ul>	<b>2</b>
<b>9-8</b>	<b>Translations</b> CCSS.MATH.CONTENT.8.G.A.1 CCSS.MATH.CONTENT.8.G.A.2 CCSS.MATH.CONTENT.8.G.A.3 CCSS.MATH.CONTENT.8.G.A.4	<ul style="list-style-type: none"> <li>Verify experimentally the properties of translations: lines are taken to lines, and line segments to line segments of the same length, angles are taken to angles of the same measure, parallel lines are taken to parallel lines.</li> <li>Understand that a two-dimensional figure is congruent to another if the second can be obtained from the first by a sequence of translations; given two congruent figures, describe a sequence that exhibits the congruence between them.</li> <li>Describe the effect of translations on two-dimensional figures using coordinates.</li> <li>Understand that a two-dimensional figure is similar to another if the second can be obtained from the first by a sequence of translations; given two similar two-dimensional figures, describe a sequence that exhibits the similarity between them.</li> </ul>	<b>2</b>

**9-9 Symmetry and Rotations**

CCSS.MATH.CONTENT.8.G.A.1

CCSS.MATH.CONTENT.8.G.A.2

CCSS.MATH.CONTENT.8.G.A.3

CCSS.MATH.CONTENT.8.G.A.4

- Verify experimentally the properties of reflections and rotations: lines are taken to lines, and line segments to line segments of the same length, angles are taken to angles of the same measure, parallel lines are taken to parallel lines.
- Understand that a two-dimensional figure is congruent to another if the second can be obtained from the first by a sequence of reflections and rotations; given two congruent figures, describe a sequence that exhibits the congruence between them.
- Describe the effect of rotations, and reflections on two-dimensional figures using coordinates.
- Understand that a two-dimensional figure is similar to another if the second can be obtained from the first by a sequence of reflections and rotation; given two similar two-dimensional figures, describe a sequence that exhibits the similarity between them.

**2****9-10 Rotations**

CCSS.MATH.CONTENT.8.G.A.1

CCSS.MATH.CONTENT.8.G.A.2

CCSS.MATH.CONTENT.8.G.A.3

CCSS.MATH.CONTENT.8.G.A.4

- Verify experimentally the properties of rotations: lines are taken to lines, and line segments to line segments of the same length, angles are taken to angles of the same measure, parallel lines are taken to parallel lines.
- Understand that a two-dimensional figure is congruent to another if the second can be obtained from the first by a sequence of rotations; given two congruent figures, describe a sequence that exhibits the congruence between them.
- Describe the effect of rotations, on two-dimensional figures using coordinates.
- Understand that a two-dimensional figure is similar to another if the second can be obtained from the first by a sequence of rotations; given two similar two-dimensional figures, describe a sequence that exhibits the similarity between them.

**2**

## Unit 10 - Area and Volume

**Total Number of Instructional Days 13**

	Common Core Standard Covered	Major Topics/Concepts	Number of days
<b>10-1</b>	<b>Area of Parallelograms</b>  CCSS.MATH.CONTENT.6.G.A.1 CCSS.MATH.CONTENT.7.G.B.6	<ul style="list-style-type: none"> <li>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.</li> <li>Solve real-world and mathematical problems involving area, volume and surface area of two- and three-dimensional objects composed of triangles, quadrilaterals, polygons, cubes, and right prisms.</li> </ul>	<b>2</b>
<b>10-2</b>	<b>Area of Triangles and Trapezoids</b>  CCSS.MATH.CONTENT.6.G.A.4 CCSS.MATH.CONTENT.7.G.B.6	<ul style="list-style-type: none"> <li>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.</li> <li>Solve real-world and mathematical problems involving area, volume and surface area of two- and three-dimensional objects composed of triangles, quadrilaterals, polygons, cubes, and right prisms.</li> </ul>	<b>2</b>
<b>10-3</b>	<b>Area of Circles</b>  CCSS.MATH.CONTENT.7.G.B.4 CCSS.MATH.CONTENT.7.G.B.6	<ul style="list-style-type: none"> <li>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.</li> <li>Solve real-world and mathematical problems involving area, volume and surface area of two- and three-dimensional objects composed of triangles, quadrilaterals, polygons, cubes, and right prisms.</li> </ul>	<b>1</b>
<b>10-4</b>	<b>Space Figures</b> CCSS.MATH.CONTENT.6.G.A.4 CSS.MATH.CONTENT.7.G.A.3	<ul style="list-style-type: none"> <li>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.</li> </ul>	<b>2</b>

		<ul style="list-style-type: none"><li>Describe the two-dimensional figures that result from slicing three-dimensional figures, as in plane sections of right rectangular prisms and right rectangular pyramids.</li></ul>	
<b>10-5</b>	<b>Surface Area of Prisms and Cylinders</b>	<ul style="list-style-type: none"><li>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.</li><li>Describe the two-dimensional figures that result from slicing three-dimensional figures, as in plane sections of right rectangular prisms and right rectangular pyramids.</li><li>Solve real-world and mathematical problems involving area, volume and surface area of two- and three-dimensional objects composed of triangles, quadrilaterals, polygons, cubes, and right prisms.</li></ul>	<b>2</b>
	CCSS.MATH.CONTENT.6.G.A.4 CCSS.MATH.CONTENT.7.G.A.3 CCSS.MATH.CONTENT.7.G.B.6		
<b>10-6</b>	<b>Surface Area of Pyramids, Cones, and Spheres</b>	<ul style="list-style-type: none"><li>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.</li><li>Describe the two-dimensional figures that result from slicing three-dimensional figures, as in plane sections of right rectangular prisms and right rectangular pyramids.</li><li>Solve real-world and mathematical problems involving area, volume and surface area of two- and three-dimensional objects composed of triangles, quadrilaterals, polygons, cubes, and right prisms.</li></ul>	<b>2</b>
	CCSS.MATH.CONTENT.6.G.A.4 CCSS.MATH.CONTENT.7.G.A.3 CCSS.MATH.CONTENT.7.G.B.6		

<b>10-7</b>	<b>Volumes of Prisms and Cylinders</b>	<ul style="list-style-type: none"><li>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 <math>V = l w h</math> and <math>V = b h</math> to find volumes of right rectangular prisms with fractional edge lengths in the context of solving real-world and mathematical problems.</li><li>Solve real-world and mathematical problems involving area, volume and surface area of two- and three-dimensional objects composed of triangles, quadrilaterals, polygons, cubes, and right prisms.</li><li>Know the formulas for the volumes of cones, cylinders, and spheres and use them to solve real-world and mathematical problems.</li></ul>	<b>1</b>
	CCSS.MATH.CONTENT.6.G.A.2 CCSS.MATH.CONTENT.7.G.B.6 CCSS.MATH.CONTENT.8.G.C.9		
<b>10-8</b>	<b>Volume of Pyramids, Cones, and Spheres</b>	<ul style="list-style-type: none"><li>Solve real-world and mathematical problems involving area, volume and surface area of two- and three-dimensional objects composed of triangles, quadrilaterals, polygons, cubes, and right prisms.</li><li>Know the formulas for the volumes of cones, cylinders, and spheres and use them to solve real-world and mathematical problems.</li></ul>	<b>1</b>
	CCSS.MATH.CONTENT.7.G.B.6 CCSS.MATH.CONTENT.8.G.C.9		

## Unit 11 - Right Triangles in Algebra

Total Number of Instructional Days 10

	Common Core Standard Covered	Major Topics/Concepts	Number of days
11-1	<b>Square Roots and Irrational Numbers</b>  CCSS.MATH.CONTENT.8.EE.A.2 CCSS.MATH.CONTENT.8.NS.A.1 CCSS.MATH.CONTENT.8.NS.A.2	<ul style="list-style-type: none"> <li>Use square root and cube root symbols to represent solutions to equations of the form <math>x^2 = p</math> and <math>x^3 = p</math>, where <math>p</math> is a positive rational number. Evaluate square roots of small perfect squares and cube roots of small perfect cubes. Know that <math>\sqrt{2}</math> is irrational.</li> <li>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.</li> <li>Use rational approximations of irrational numbers to compare the size of irrational numbers, locate them approximately on a number line diagram, and estimate the value of expressions (e.g., <math>\pi^2</math>).</li> </ul>	2
11-2	<b>The Pythagorean Theorem</b>  CCSS.MATH.CONTENT.8.G.B.6 CCSS.MATH.CONTENT.8.G.B.7 CCSS.MATH.CONTENT.8.G.B.8	<ul style="list-style-type: none"> <li>Explain a proof of the Pythagorean Theorem and its converse.</li> <li>Apply the Pythagorean Theorem to determine unknown side lengths in right triangles in real-world and mathematical problems in two and three dimensions.</li> <li>Apply the Pythagorean Theorem to find the distance between two points in a coordinate system.</li> </ul>	2
11-3	<b>Distance and Midpoint Formulas</b>  CCSS.MATH.CONTENT.6.G.A.3 CCSS.MATH.CONTENT.8.G.B.8	<ul style="list-style-type: none"> <li>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.</li> <li>Apply the Pythagorean Theorem to find the distance between two points in a coordinate system.</li> </ul>	1

<b>11-4</b>	<b>Write a Proportion</b>	<ul style="list-style-type: none"> <li>Recognize and represent proportional relationships between quantities.</li> <li>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.</li> <li>Identify the constant of proportionality (unit rate) in tables, graphs, equations, diagrams, and verbal descriptions of proportional relationships.</li> <li>Represent proportional relationships by equations.</li> <li>Explain what a point <math>(x, y)</math> on the graph of a proportional relationship means in terms of the situation, with special attention to the points <math>(0, 0)</math> and <math>(1, r)</math> where <math>r</math> is the unit rate.</li> </ul>	<b>2</b>
	CCSS.MATH.CONTENT.7.RP.A.2 CCSS.MATH.CONTENT.7.RP.A.2.A CCSS.MATH.CONTENT.7.RP.A.2.B CCSS.MATH.CONTENT.7.RP.A.2.C CCSS.MATH.CONTENT.7.RP.A.2.D		
<b>11-5</b>	<b>Special Right Triangles</b>	<ul style="list-style-type: none"> <li>Draw (freehand, with ruler and protractor, and with technology) geometric shapes with given conditions. Focus on constructing triangles from three measures of angles or sides, noticing when the conditions determine a unique triangle, more than one triangle, or no triangle.</li> <li>Apply the Pythagorean Theorem to determine unknown side lengths in right triangles in real-world and mathematical problems in two and three dimensions.</li> </ul>	<b>1</b>
	CCSS.MATH.CONTENT.7.G.A.2 CCSS.MATH.CONTENT.8.G.B.7		
<b>11-6</b>	<b>Sine, Cosine, and Tangent Ratios</b>	<ul style="list-style-type: none"> <li>Use trigonometric ratios to solve real-world problems.</li> </ul>	<b>1</b>
<b>11-7</b>	<b>Angles of Elevation and Depression</b>	<ul style="list-style-type: none"> <li>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.</li> <li>Apply the Pythagorean Theorem to determine unknown side lengths in right triangles in real-world and mathematical problems in two and three dimensions.</li> </ul>	<b>1</b>
	CCSS.MATH.CONTENT.8.G.A.5 CCSS.MATH.CONTENT.8.G.B.7		

## Unit 12 - Data Analysis and Probability

**Total Number of Instructional Days 13**

Common Core Standard Covered	Major Topics/Concepts	Number of days
<b>12-1 Frequency Tables, Line Plots, and Histograms</b>  CCSS.MATH.CONTENT.6.SP.B.4 CCSS.MATH.CONTENT.7.SP.C.8.B	<ul style="list-style-type: none"> <li>• Display numerical data in plots on a number line, including dot plots, histograms, and box plots.</li> <li>• Represent sample spaces for compound events using methods such as organized lists, tables and tree diagrams.</li> </ul>	2
<b>12-2 Box-and-Whisker Plots</b>  CCSS.MATH.CONTENT.6.SP.B.4 CCSS.MATH.CONTENT.6.SP.B.5.C CCSS.MATH.CONTENT.6.SP.A.2 CCSS.MATH.CONTENT.7.SP.B.3	<ul style="list-style-type: none"> <li>• Display numerical data in plots on a number line, including dot plots, histograms, and box plots.</li> <li>• 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.</li> <li>• 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.</li> <li>• Informally assess the degree of visual overlap of two numerical data distributions with similar variability, measuring the difference between the centers by expressing it as a multiple of a measure of variability.</li> </ul>	2



<b>12-3 Stem and Leaf Plots</b>  CCSS.MATH.CONTENT.6.SP.B.4 CCSS.MATH.CONTENT.6.SP.B.4.C CCSS.MATH.CONTENT.7.SP.B.4	<ul style="list-style-type: none"> <li>• Display numerical data in plots on a number line, including dot plots, histograms, and box plots.</li> <li>• 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.</li> <li>• Use measures of center and measures of variability for numerical data from random samples to draw informal comparative inferences about two populations.</li> </ul>	2
<b>12-4 Counting Outcomes and Theoretical Probability</b>  CCSS.MATH.CONTENT.7.SP.C.5 CCSS.MATH.CONTENT.7.SP.C.7.A CCSS.MATH.CONTENT.7.SP.C.7.B CCSS.MATH.CONTENT.7.SP.C.8.A CCSS.MATH.CONTENT.7.SP.C.8.B	<ul style="list-style-type: none"> <li>• Understand that the probability of a chance event is a 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 <math>\frac{1}{2}</math> indicates an event that is neither unlikely nor likely, and a probability near 1 indicates a likely event.</li> <li>• Develop a uniform probability model by assigning equal probability to all outcomes, and use the model to determine probabilities of events. Find probabilities of compound events using organized lists, tables, tree diagrams, and simulation.</li> <li>• Find probabilities of compound events using organized lists, tables, tree diagrams, and simulation.</li> </ul>	2
<b>12-5 Independent and Dependent Events</b>  CCSS.MATH.CONTENT.7.SP.B.3 CCSS.MATH.CONTENT.7.SP.B.4	<ul style="list-style-type: none"> <li>• Informally assess the degree of visual overlap of two numerical data distributions with similar variability, measuring the difference between the centers by expressing it as a multiple of a measure of variability.</li> <li>• Use measures of center and measures of variability for numerical data from random samples to draw informal comparative inferences about two populations.</li> </ul>	2
<b>12-6 Permutations and Combinations</b>	<ul style="list-style-type: none"> <li>• Use permutations and combinations to compute probabilities of compound events and solve problems.</li> </ul>	1

**12-7 Experimental Probability**

CCSS.MATH.CONTENT.7.SP.A.2  
CCSS.MATH.CONTENT.7.SP.C.5  
CCSS.MATH.CONTENT.7.SP.C.6  
CCSS.MATH.CONTENT.7.SP.C.7.A  
CCSS.MATH.CONTENT.7.SP.C.7.B

- Use data from a random sample to draw inferences about a population with an unknown characteristic of interest. Generate multiple samples (or simulated samples) of the same size to gauge the variation in estimates or predictions.
- Understand that the probability of a chance event is a 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  $\frac{1}{2}$  indicates an event that is neither unlikely nor likely, and a probability near 1 indicates a likely event.
- Approximate the probability of a chance event by collecting data on the chance process that produces it and observing its long-run relative frequency, and predict the approximate relative frequency given the probability.
- Develop a uniform probability model by assigning equal probability to all outcomes, and use the model to determine probabilities of events.

**1****12-8 Random Samples and Surveys**

CCSS.MATH.CONTENT.7.SP.A.1  
CCSS.MATH.CONTENT.7.SP.A.2  
CCSS.MATH.CONTENT.7.SP.B.4  
CCSS.MATH.CONTENT.7.SP.C.6

- 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 sample is representative of that population. Understand that random sampling tends to produce representative samples and support valid inferences.
- Use data from a random sample to draw inferences about a population with an unknown characteristic of interest. Generate multiple samples (or simulated samples) of the same size to gauge the variation in estimates or predictions.
- Use measures of center and measures of variability for numerical data from random samples to draw informal comparative inferences about two populations.
- Approximate the probability of a chance event by collecting data on the chance process that produces it and observing its long-run relative frequency, and predict the approximate relative frequency given the probability.

**1**

## Unit 13 - Nonlinear Functions and Polynomials

Total Number of Instructional Days 8

Common Core Standard Covered	Major Topics/Concepts	Number of days
<b>13-1 Patterns and Sequences</b>  CCSS.MATH.CONTENT.8.SP.A.1 CCSS.MATH.CONTENT.8.SP.A.2 CCSS.MATH.CONTENT.8.SP.A.3 CCSS.MATH.CONTENT.8.SP.A.4	<ul style="list-style-type: none"> <li>Construct and interpret scatter plots for bivariate measurement data to investigate patterns of association between two quantities. Describe patterns such as clustering, outliers, positive or negative association, linear association, and nonlinear association.</li> <li>Know that straight lines are widely used to model relationships between two quantitative variables. For scatter plots that suggest a linear association, informally fit a straight line, and informally assess the model fit by judging the closeness of the data points to the line.</li> <li>Use the equation of a linear model to solve problems in the context of bivariate measurement data, interpreting the slope and intercept</li> <li>Understand that patterns of association can also be seen in bivariate categorical data by displaying frequencies and relative frequencies in a two-way table. Construct and interpret a two-way table summarizing data on two categorical variables collected from the same subjects. Use relative frequencies calculated for rows or columns to describe possible association between the two variables.</li> </ul>	1
<b>13-2 Graphing Nonlinear Functions</b>  CCSS.MATH.CONTENT.8.F.A.3	<ul style="list-style-type: none"> <li>Interpret the equation <math>y = mx + b</math> as defining a linear function, whose graph is a straight line; give examples of functions that are not linear.</li> </ul>	1
<b>13-3 Exponential Growth and Decay</b>  CCSS.MATH.CONTENT.8.F.B.5	<ul style="list-style-type: none"> <li>Describe qualitatively the functional relationship between two quantities by analyzing a graph (e.g., where the function is increasing or decreasing, linear or nonlinear). Sketch a graph that exhibits the qualitative features of a function that has been described verbally.</li> </ul>	1

<b>13-4</b>	<b>Polynomials</b>	<ul style="list-style-type: none"> <li>Understand that polynomials form a system analogous to the integers, namely, they are closed under the operations of addition, subtraction, and multiplication; add, subtract, and multiply polynomials.</li> </ul>	<b>1</b>
<b>13-5</b>	<b>Adding and Subtracting Polynomials</b>	<ul style="list-style-type: none"> <li>Understand that polynomials form a system analogous to the integers, namely, they are closed under the operations of addition, subtraction, and multiplication; add, subtract, and multiply polynomials.</li> </ul>	<b>1</b>
<b>13-6</b>	<b>Multiplying a Polynomial by a Monomial</b>	<ul style="list-style-type: none"> <li>Understand that polynomials form a system analogous to the integers, namely, they are closed under the operations of addition, subtraction, and multiplication; add, subtract, and multiply polynomials.</li> </ul>	<b>1</b>
<b>13-7</b>	<b>Multiplying Binomials</b>	<ul style="list-style-type: none"> <li>Apply properties of operations as strategies to add, subtract, factor, and expand linear expressions with rational coefficients.</li> <li>Solve multi-step real-life and mathematical problems posed with positive and negative rational numbers in any form using tools strategically.</li> <li>Apply properties of operations as strategies to multiply and divide rational numbers.</li> </ul>	<b>1</b>
	CCSS.MATH.CONTENT.7.EE.A.1		
	CCSS.MATH.CONTENT.7.EE.B.3		
	CCSS.MATH.CONTENT.7.NS.A.2.C		
<b>13-8</b>	<b>Using Multiple Strategies</b>	<ul style="list-style-type: none"> <li>Apply properties of operations as strategies to add, subtract, factor, and expand linear expressions with rational coefficients.</li> <li>Solve multi-step real-life and mathematical problems posed with positive and negative rational numbers in any form using tools strategically.</li> <li>Apply properties of operations as strategies to multiply and divide rational numbers.</li> </ul>	<b>1</b>
	CCSS.MATH.CONTENT.7.EE.A.1		
	CCSS.MATH.CONTENT.7.EE.B.3		
	CCSS.MATH.CONTENT.7.NS.A.2.C		