

## Sixth Grade Quarter 1

**Month:** August, September, October

**Domain(s):**

- Expressions and Equations (EE)
- The Number System (NS)

**Cluster(s):**

- Apply and extend previous understandings of arithmetic to algebraic expressions.
- Reason about and solve one-variable equations and inequalities.
- Represent and analyze quantitative relationships between dependent and independent variables.
- Apply and extend previous understandings of numbers to the system of rational numbers.

**Standard(s):**

**6.EE.1:** Write and evaluate numerical expressions involving whole-number exponents.

**6.EE.2:** Write, read, and evaluate expressions in which letters stand for numbers.

- Write expressions that record operations with numbers and with letters standing for numbers. *For example, express the calculation “Subtract  $y$  from 5” as  $5 - y$ .*
- Identify parts of an expression using mathematical terms (sum, term, product, factor, quotient, coefficient); view one or more parts of an expression as a single entity. *For example, describe the expression  $2(8 + 7)$  as a product of two factors; view  $(8 + 7)$  as both a single entity and a sum of two terms.*
- 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). *For example, use the formulas  $V = s^3$  and  $A = 6s^2$  to find the volume and surface area of a cube with sides of length  $s = 1/2$ .*

**6.EE.3:** Apply the properties of operations to generate equivalent expressions. *For example, apply the distributive property to*

*the expression  $3(2 + x)$  to produce the equivalent expression  $6 + 3x$ ; apply the distributive property to the expression  $24x + 18y$  to produce the equivalent expression  $6(4x + 3y)$ ; apply properties of operations to  $y + y + y$  to produce the equivalent expression  $3y$ .*

**6.EE.4:** Identify when two expressions are equivalent (i.e., when the two expressions name the same number regardless of which value is substituted into them). *For example, the expressions  $y + y + y$  and  $3y$  are equivalent because they name the same number regardless of which number  $y$  stands for. Reason about and solve one-variable equations and inequalities.*

**6.NS.5:** Understand that positive and negative numbers are used together to describe quantities having opposite directions or values (e.g., temperature above/below zero, elevation above/below sea level, credits/debits, positive/negative electric charge); use positive and negative numbers to represent quantities in real-world contexts, explaining the meaning of 0 in each situation.

**6.NS.6:** 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.

- a. Recognize opposite signs of numbers as indicating locations on opposite sides of 0 on the number line; recognize that the opposite of the opposite of a number is the number itself, e.g.,  $-(-3) = 3$ , and that 0 is its own opposite.
- b. 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.
- c. 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.

**6.NS.7:** Understand ordering and absolute value of rational numbers.

- a. Interpret statements of inequality as statements about the relative position of two numbers on a number line diagram. *For example, interpret  $-3 > -7$  as a statement that  $-3$  is located to the right of  $-7$  on a number line oriented from left to right.*

- b. Write, interpret, and explain statements of order for rational numbers in real-world contexts. *For example, write  $-3^{\circ}\text{C} > -7^{\circ}\text{C}$  to express the fact that  $-3^{\circ}\text{C}$  is warmer than  $-7^{\circ}\text{C}$ .*
- c. 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. *For example, for an account balance of  $-30$  dollars, write  $|-30| = 30$  to describe the size of the debt in dollars.*
- d. Distinguish comparisons of absolute value from statements about order. *For example, recognize that an account balance less than  $-30$  dollars represents a debt greater than 30 dollars.*

**6.NS.8:** 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.

**Targeted Skills:**

- Identify variables, numerical expressions, and variable expressions.
- Use variable expressions to represent word phrases.
- Use the order of operations to evaluate numerical expressions.
- Evaluate variable expressions.
- Solve word problems by writing and evaluating variable expressions.
- Write, represent, graph, compare, and order integers.
- Identify and find opposites and absolute value.
- Graph absolute value on a number line.
- Perform operations with integers (add, subtract, multiply, and divide).
- Solve word problems involving operations with integers.
- Graph ordered pairs in a coordinate system using all four quadrants.
- Find the distance between two points using the Distance Formula.
- To find the midpoint of a segment using the Midpoint Formula.
- Use the Properties of Numbers (Associative, Commutative, Identity, Distributive) to identify and generate equivalent expressions, as well as solve word problems.
- Identify parts of an expression.

- Identify when two expressions are equivalent.
- Simplify expressions.
- Classify types of equations.
- Check given solutions to equations.
- Solve one-step equations.
- Write and solve one step equations for word problems.

**Key Vocabulary:**

variable	expression	order of operations	evaluate	integer	opposite	absolute
value	zero pair	coordinate plane(system)		x-axis	y-axis	quadrant
ordered pair	x& y-coordinate	origin	distance formula(between two points)			
midpoint(between two points)		commutative	associative	identity	distributive	term
open	sentence					
like term	constant	coefficient	simplify	deductive	reasoning	equation
solution	inverse operation					

## Sixth Grade Quarter 2

**Month:** November, December, January

**Domain(s):**

- Expressions and Equations (EE)
- The Number System (NS)
- Statistics and Probability (SP)
- Ratio and Proportional Relationships (RP)
- Geometry (G)

**Cluster(s):**

- Reason about and solve one-variable equations and inequalities.
- Compute fluently with multi-digit numbers and find common factors and multiples.
- Developing understanding of statistical variability.
- Summarize and describe distributions.
- Understand ratio concepts and use ratio reasoning to solve problems.
- Solve real world and mathematical problems involving area, surface area, and volume.

**Standard(s):**

**6.EE.5:** 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 substitution to determine whether a given number in a specified set makes an equation or inequality true.

**6.EE.6:** Use variables to represent numbers and write expressions when solving a real-world or mathematical problem; understand that a variable can represent an unknown number, or, depending on the purpose at hand, any number in a specified set.

**6.EE.7:** Solve real-world and mathematical problems by writing and solving equations of the form  $x + p = q$  and  $px = q$  for cases in which  $p$ ,  $q$  and  $x$  are all nonnegative rational numbers.

**6.EE.8:** Write an inequality of the form  $x > c$  or  $x < c$  to represent a constraint or condition in a real-world or mathematical

problem. Recognize that inequalities of the form  $x > c$  or  $x < c$  have infinitely many solutions; represent solutions of such inequalities on number line diagrams.

**6.NS.2:** Fluently divide multi-digit numbers using the standard algorithm.

**6.NS.3:** Fluently add, subtract, multiply, and divide multi-digit decimals using the standard algorithm for each operation.

**6.NS.4:** 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. *For example, express  $36 + 8$  as  $4(9 + 2)$ . Apply and extend previous understandings of numbers to the system of rational numbers.*

**6.SP.1:** Recognize a statistical question as one that anticipates variability in the data related to the question and accounts for it in the answers. *For example, “How old am I?” is not a statistical question, but “How old are the students in my school?” is a statistical question because one anticipates variability in students’ ages.*

**6.SP.2:** Understand that a set of data collected to answer a statistical question has a distribution which can be described by its center, spread, and overall shape.

**6.SP.3:** Recognize that a measure of center for a numerical data set summarizes all of its values with a single number, while a measure of variation describes how its values vary with a single number.

**6.RP.1:** Understand the concept of a ratio and use ratio language to describe a ratio relationship between two quantities. *For example, “The ratio of wings to beaks in the bird house at the zoo was 2:1, because for every 2 wings there was 1 beak.” “For every vote candidate A received, candidate C received nearly three votes.”*

**6.RP.2:** Understand the concept of a unit rate  $a/b$  associated with a ratio  $a:b$  with  $b \neq 0$ , and use rate language in the context of a ratio relationship. *For example, “This recipe has a ratio of 3 cups of flour to 4 cups of sugar, so there is  $3/4$  cup of flour for each cup of sugar.” “We paid \$75 for 15 hamburgers, which is a rate of \$5 per hamburger.”<sup>1</sup>*

**6.RP.3:** Use ratio and rate reasoning to solve real-world and mathematical problems, e.g., by reasoning about tables of equivalent ratios, tape diagrams, double number line diagrams, or equations.

- a. Make tables of equivalent ratios relating quantities with whole-number measurements, find missing values in the tables, and plot the pairs of values on the coordinate plane. Use tables to compare ratios.
- b. Solve unit rate problems including those involving unit pricing and constant speed. *For example, if it took 7 hours to mow 4 lawns, then at that rate, how many lawns could be mowed in 35 hours? At what rate were lawns being mowed?*
- c. Find a percent of a quantity as a rate per 100 (e.g., 30% of a quantity means 30/100 times the quantity); solve problems involving finding the whole, given a part and the percent.
- d. Use ratio reasoning to convert measurement units; manipulate and transform units appropriately when multiplying or dividing quantities.

**6.G.1:** Find the area of right triangles, other triangles, special quadrilaterals, and polygons by composing into rectangles or decomposing into triangles and other shapes; apply these techniques in the context of solving real-world and mathematical problems.

**6.G.2:** Find the volume of a right rectangular prism with fractional edge lengths by packing it with unit cubes of the appropriate unit fraction edge lengths, and show that the volume is the same as would be found by multiplying the edge lengths of the prism. Apply the formulas  $V = lwh$  and  $V = bh$  to find volumes of right rectangular prisms with fractional edge lengths in the context of solving real-world and mathematical problems.

**6.G.3:** Draw polygons in the coordinate plane given coordinates for the vertices; use coordinates to find the length of a side joining points with the same first coordinate or the same second coordinate. Apply these techniques in the context of solving real-world and mathematical problems.

**6.G.4:** Represent three-dimensional figures using nets made up of rectangles and triangles, and use the nets to find the surface area of these figures. Apply these techniques in the context of solving real-world and mathematical problems.

**Targeted Skills:**

- Write and graph inequalities.
- Use inequalities to represent real-world situations.
- Solve one-step inequalities and graph the solutions on a number line.

- Use inequalities to solve word problems.
- Fluently add, subtract, multiply, and divide decimals.
- Solve equations with decimals.
- Use decimal equations to solve word problems.
- Find the area of polygons.
- Find the area of irregular figures by breaking them into simple figures.
- Find the volume of a right rectangular prism.
- Show that volume of a right rectangular prism is the same when using the formula and unit cubes.
- Draw polygons in a coordinate plane when given coordinates.
- Represent three-dimensional figures using nets made up for rectangles and triangles.
- Find the surface area of three-dimensional figures using nets.
- Use nets to find the surface area and solve real-world word problems.
- Find the area and circumference of a circle.
- Solve word problems involving area and circumference of a circle.
- Use ratio and proportion to find missing side lengths on similar figures.
- Recognize statistical question as one that anticipates variability in the answers.
- Collect statistical data.
- Find measures of central tendency (mean, median, mode).
- Find measures of variation (range, outlier)
- Know when to use each type of central tendency to describe statistical data.
- Understand the difference between a measure of center and a measure of variation within statistical data.
- Summarize numerical data sets.
- Display numerical data sets (number line, dot plot, histogram, box plot, bar graph, line graph).

**Key Vocabulary:**

inequality	solution of inequality	decimal	area	polygon	irregular figure	volume
surface area	three-dimensional figure	net	formula	circumference	pi	similar
congruent	ratio	proportion	corresponding side	data	mean	
median	mode	range	outlier	variation	dot plot	box plot
line graph	bar graph					

measure of central tendency

number line

histogram

Brookwood School District 167

Aligned to New Math Common Core State Standards

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## Sixth Grade Quarter 3

**Month:** December, January, February, March

**Domain(s):**

- Expressions and Equations (EE)
- The Number System (NS)

**Cluster(s):**

- Apply and extend previous understandings of arithmetic to algebraic expressions.
- Apply and extend previous understandings of multiplication and division to divide fractions by fractions.
- Compute fluently with multi-digit numbers and find common factors and multiples.
- Apply and extend previous understandings of numbers to the system of rational numbers.

**Standard(s):**

**6.EE.1:** Write and evaluate numerical expressions involving whole-number exponents.

**6.EE.2:** Write, read, and evaluate expressions in which letters stand for numbers.

- Write expressions that record operations with numbers and with letters standing for numbers. *For example, express the calculation “Subtract  $y$  from 5” as  $5 - y$ .*
- Identify parts of an expression using mathematical terms (sum, term, product, factor, quotient, coefficient); view one or more parts of an expression as a single entity. *For example, describe the expression  $2(8 + 7)$  as a product of two factors; view  $(8 + 7)$  as both a single entity and a sum of two terms.*
- 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). *For example, use the formulas  $V = s^3$  and  $A = 6s^2$  to find the volume and surface area of a cube with sides of length  $s = 1/2$ .*

**6.EE.3:** Apply the properties of operations to generate equivalent expressions. *For example, apply the distributive property to*

*the expression  $3(2 + x)$  to produce the equivalent expression  $6 + 3x$ ; apply the distributive property to the expression  $24x + 18y$  to produce the equivalent expression  $6(4x + 3y)$ ; apply properties of operations to  $y + y + y$  to produce the equivalent expression  $3y$ .*

**6.EE.4:** Identify when two expressions are equivalent (i.e., when the two expressions name the same number regardless of which value is substituted into them). *For example, the expressions  $y + y + y$  and  $3y$  are equivalent because they name the same number regardless of which number  $y$  stands for. Reason about and solve one-variable equations and inequalities.*

**6.NS.1:** Interpret and compute quotients of fractions, and solve word problems involving division of fractions by fractions, e.g., by using visual fraction models and equations to represent the problem. *For example, create a story context for  $(2/3) \div (3/4)$  and use a visual fraction model to show the quotient; use the relationship between multiplication and division to explain that  $(2/3) \div (3/4) = 8/9$  because  $3/4$  of  $8/9$  is  $2/3$ . (In general,  $(a/b) \div (c/d) = ad/bc$ .) How much chocolate will each person get if 3 people share  $1/2$  lb of chocolate equally? How many  $3/4$ -cup servings are in  $2/3$  of a cup of yogurt? How wide is a rectangular strip of land with length  $3/4$  mi and area  $1/2$  square mi? Compute fluently with multi-digit numbers and find common factors and multiples.*

**6.NS.2:** Fluently divide multi-digit numbers using the standard algorithm.

**6.NS.3:** Fluently add, subtract, multiply, and divide multi-digit decimals using the standard algorithm for each operation.

**6.NS.4:** 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. *For example, express  $36 + 8$  as  $4(9 + 2)$ . Apply and extend previous understandings of numbers to the system of rational numbers.*

**6.NS.5:** Understand that positive and negative numbers are used together to describe quantities having opposite directions or values (e.g., temperature above/below zero, elevation above/below sea level, credits/debits, positive/negative electric charge); use positive and negative numbers to represent quantities in real-world contexts, explaining the meaning of 0 in each situation.

**6.NS.6:** 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.

- a. Recognize opposite signs of numbers as indicating locations on opposite sides of 0 on the number line; recognize that the opposite of the opposite of a number is the number itself, e.g.,  $-(-3) = 3$ , and that 0 is its own opposite.
- b. 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.
- c. 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.

**6.NS.7:** Understand ordering and absolute value of rational numbers.

- a. Interpret statements of inequality as statements about the relative position of two numbers on a number line diagram. *For example, interpret  $-3 > -7$  as a statement that  $-3$  is located to the right of  $-7$  on a number line oriented from left to right.*
- b. Write, interpret, and explain statements of order for rational numbers in real-world contexts. *For example, write  $-3^{\circ}\text{C} > -7^{\circ}\text{C}$  to express the fact that  $-3^{\circ}\text{C}$  is warmer than  $-7^{\circ}\text{C}$ .*
- c. 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. *For example, for an account balance of  $-30$  dollars, write  $|-30| = 30$  to describe the size of the debt in dollars.*
- d. Distinguish comparisons of absolute value from statements about order. *For example, recognize that an account balance less than  $-30$  dollars represents a debt greater than 30 dollars.*

**6.NS.8:** 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.

**Targeted Skills:**

- Use exponents.
- Solve order of operations problems including exponents.
- Find GCF of two or more numbers, including variables.
- Find equivalent and simplified fractions, including variables.
- Identify and graph rational numbers.
- Evaluate fractions containing variables.
- Translating fractions, decimals, and percents.
- Comparing and Ordering fractions, decimals, and percents.
- Multiplying and dividing fractions (rational numbers).
- Solve word problems involving multiplication and division of fractions.
- Solve equations using addition, subtracting, multiplication, and division of fractions.

**Key Vocabulary:**

base	exponent	power	factor	GCF	multiples	LCM	prime
composite	equivalent fraction		simplest form		rational number		fraction
decimal	percent	reciprocal	metric	conversion			

## Sixth Grade Quarter 4

**Month:** March, April, May, June

**Domain(s):**

- Ratios and Proportional Relationships (RP)

**Cluster(s):**

- Understand ratio concepts and use ratio reasoning to solve problems.

**Standard(s):**

**6.RP.1:** Understand the concept of a ratio and use ratio language to describe a ratio relationship between two quantities. *For example, “The ratio of wings to beaks in the bird house at the zoo was 2:1, because for every 2 wings there was 1 beak.” “For every vote candidate A received, candidate C received nearly three votes.”*

**6.RP.2:** Understand the concept of a unit rate  $a/b$  associated with a ratio  $a:b$  with  $b \neq 0$ , and use rate language in the context of a ratio relationship. *For example, “This recipe has a ratio of 3 cups of flour to 4 cups of sugar, so there is  $3/4$  cup of flour for each cup of sugar.” “We paid \$75 for 15 hamburgers, which is a rate of \$5 per hamburger.”<sup>1</sup>*

**6.RP.3:** Use ratio and rate reasoning to solve real-world and mathematical problems, e.g., by reasoning about tables of equivalent ratios, tape diagrams, double number line diagrams, or equations.

- 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.
- Solve unit rate problems including those involving unit pricing and constant speed. *For example, if it took 7 hours to mow 4 lawns, then at that rate, how many lawns could be mowed in 35 hours? At what rate were lawns being mowed?*
- 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.
- Use ratio reasoning to convert measurement units; manipulate and transform units appropriately when multiplying or

dividing quantities.

**Targeted Skills:**

- Understand, write, and simplify ratios.
- Use ratio language to describe the ratio relationship between two quantities.
- Find rates and unit rate.
- Solve unit rate word problems.
- Set up proportions.
- Solve proportions.
- Use proportions to solve word problems.
- Solve problems that involve similar figures.
- Solve problems that involve scale drawings.
- Solve problems using indirect measurement.
- Calculate percent of a quantity using proportion with a rate over 100.
- Use ratio and proportion to convert units of measurement.

**Key Vocabulary:**

ratio          rate                  unit rate                  proportion                  cross products                  similar figures                  scale drawing  
indirect measurement