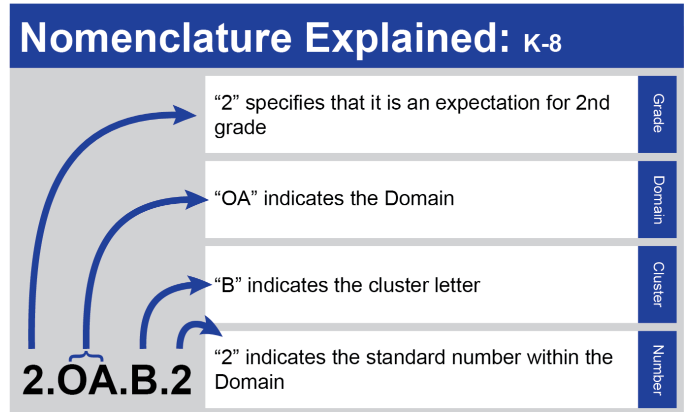
Arkansas Mathematics Standards
Grade 6
2022

Introduction to the Grades K-8 Arkansas Mathematics Standards

When the Division of Elementary and Secondary Education (DESE) began the process of revising math standards, a diverse group of qualified educators from across the state came together to craft Arkansas standards specific to the schools and students in the state. The result of this work, the Arkansas Mathematics Standards, is contained in this document. These standards reflect what educators across the state know to be best for Arkansas students.

Standards Organization: The revision committee maintained the organizational structure and nomenclature of the previous standards. K-8 Arkansas Mathematics Standards are categorized into domains, clusters, and standards.

- **Domains** represent the big ideas to be studied at each grade level and sometimes across grade bands. These big ideas support educators in determining the proper amount of focus and instructional time to be given to each of these topics.
- **Clusters** represent collections of standards grouped to help educators understand the building blocks of rich and meaningful instructional units. These units help students make connections within clusters and avoid seeing mathematics as a discrete list of skills they must master.
- **Standards** represent the foundational building blocks of math instruction. The standards outlined in this document work together to ensure that students are college and career ready and on track for success.



Standards Support: The revision of the Arkansas Mathematics Standards represent the work of the committee to provide greater clarity, strength, and support of the standards. Additionally, the revised mathematics standards are designed to help educators better understand the areas of emphasis and the focus within the standards. Educators should address the bulleted content as more than a checklist of items that they must teach individually. Content is bulleted to provide specificity of learning expectations included within some extensive standards. In some instances, the standard document includes Arkansas examples, teacher notes, specifications, and italicized words to assist educators with planning, teaching, and student learning.

- **Examples** included in the original standards were either changed for clarity or separated from the body of the actual standard. The examples included in the body of the standards document in no way reflect all of the possible examples. Likewise, these examples do not mandate curriculum or problem types. Local districts are free to select the high-quality curricula and instructional methods that best meet the needs of their students.
- **Teacher notes** offer clarification of the standards. These notes are intended to clarify, for teachers, what the expectations are for the learner. Likewise, these notes provide instructional guidance and limitations so that educators can better understand the scope of the standard. This will help with determining what is developmentally appropriate for students when working with specific standards.
- **Standard specifications** are to strengthen standards. The specifications are precise statements highlighting the need for mastery or function-type parameters for specific standards. This will assist educators in pinpointing the best opportunities for students to gain and master the knowledge and skills needed to succeed in a progression.
- **Italicized words** are defined in the glossary.

Finally, the Arkansas Mathematics Standards will be a living document. As these standards are implemented across schools in the state, DESE welcomes further suggestions related to notes of clarification, examples, professional development needs, and future revisions of the standards.

K-12 Standards for Mathematical Practices

1. Make sense of problems and persevere in solving them.
2. Reason abstractly and quantitatively.
3. Construct viable arguments and critique the reasoning of others.
4. Model with mathematics.
5. Use appropriate tools strategically.
6. Attend to precision.
7. Look for and make use of structure.
8. Look for and express regularity in repeated reasoning.

Sixth Grade Standards: Overview

Abbreviations: The following abbreviations are for the domains for the Arkansas Mathematics Standards.

Ratios and Proportional Relationships – RP

- Understand ratio concepts and use ratio reasoning to solve problems

The Number System – NS

- Apply and extend previous understanding 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

Expressions and Equations – EE

- 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

Geometry – G

- Solve real-world and mathematical problems involving area, surface area, and volume

Statistics and Probability – SP

- Develop understanding of statistical variability
- Summarize and describe distributions

Ratios and Proportional Relationships	
Cluster A: Understand ratio concepts and use ratio reasoning to solve problems.	
AR.Math.Content.6.RP.A.1	Understand the concept of a *ratio* and use *ratio* language (a:b, $\frac{a}{b}$, a to b) to describe a *ratio* as a relationship between two quantities. Teacher Note: Examples: • The *ratio* of wings to beaks at the zoo is 2:1 (or 2 to 1, $\frac{2}{1}$), because for every 2 wings there was 1 beak. • For every vote Candidate A received, Candidate C received three votes.
AR.Math.Content.6.RP.A.2	Understand the concept of a *unit rate* as a special ratio comparison for every one unit, using *rate* language (per, each, for every) to find a *unit rate* from a given ratio. Teacher Note: For a *ratio* a:b with b ≠ 0. Expectations for *unit rates* in this grade are limited to non-*complex fractions*. Examples: • We paid $75 for 15 hamburgers, which is a *rate* of $5 per hamburger. • This recipe has a *ratio* of 3 cups of flour to 4 cups of sugar, so there is $\frac{3}{4}$ cup of flour for each cup of sugar. • For every 5 raffle tickets, the cost is $1

AR.Math.Content.6.RP.A.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*):

- Use and create tables to compare equivalent ratios relating quantities with whole-number measurements, find missing values in the tables, and *plot* the pairs of values on the *coordinate plane.*
- Solve *unit rate* problems including those involving unit pricing and constant speed.
- Find a *percent* of a quantity as a *rate* per 100 and solve problems involving finding the whole, given a part and the *percent* using the ratio reasoning models listed above.
- Manipulate and convert measurements using given r*atios.*

Teacher Note: *Conversion factors* will be given. Conversions can occur within a measurement system (feet to miles, meters to centimeters) or between measurement systems (kilometers to miles). Estimates are not expected.

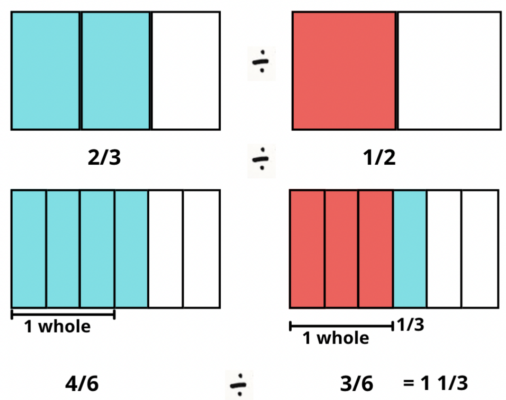
Examples:

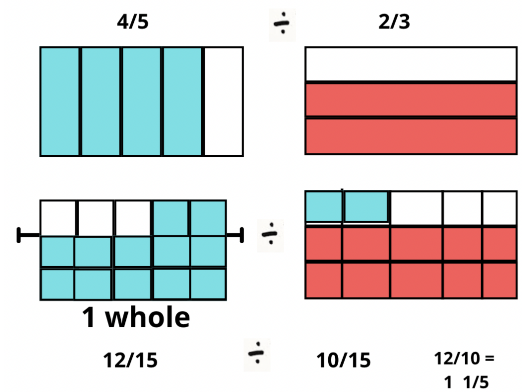
- If it took 7 hours to mow 4 lawns, then at that rate, how many lawns could be mowed in 35 hours? At what rate were lawns being mowed?
- 30% of a quantity means $\frac{30}{100}$ times the quantity

yards	inches
1	36
2	**x**
3	108
x	144

<table>
<tr><th colspan="2">The Number System</th></tr>
<tr><th colspan="2">Cluster A: Apply and extend previous understandings of multiplication and division to divide fractions by fractions.</th></tr>
<tr><td>AR.Math.Content.6.NS.A.1</td><td>Use common denominator and visual models to:
● Interpret and compute quotients of fractions.
● Solve word problems involving division of fractions by fractions using various strategies.

Teacher Note: This includes all forms of fractions - fractions less than one, fractions greater than one (improper fractions), and mixed numbers.

Examples:



</td></tr>
<tr><th colspan="2">Cluster B: Compute fluently with multi-digit numbers and find common factors and multiples.</th></tr>
<tr><td>AR.Math.Content.6.NS.B.2</td><td>Use computational fluency to divide multi-digit numbers using any standard algorithm such as partial quotient and traditional recording system (long division).

Teacher Note: A standard algorithm denotes any valid base-ten strategy (any strategy based on place value and properties of operations).</td></tr>
<tr><td>AR.Math.Content.6.NS.B.3</td><td>Use computational fluency to add, subtract, multiply, and divide multi-digit decimals and fractions using any standard algorithm for each operation.

Teacher Note: A standard algorithm denotes any valid base-ten strategy (any strategy based on place value and properties of operations).</td></tr>
</table>

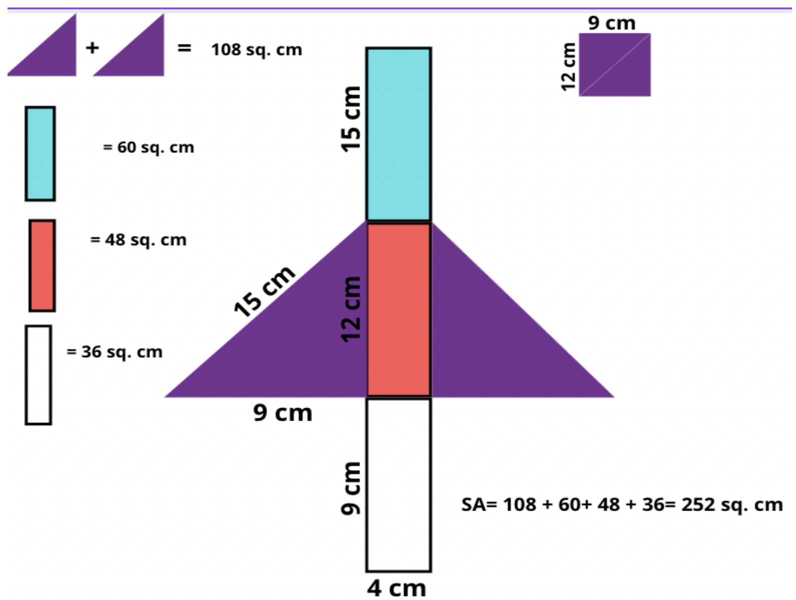
AR.Math.Content.6.NS.B.4	Understand and use *prime factorization*: ● Find the *greatest common factor* of two whole numbers less than or equal to 100 using *prime factorization* and organized lists. ● Find the *least common multiple* of two whole numbers less than or equal to 12 using *prime factorization* and organized lists. ● Use the *greatest common factor* and the *distributive property* to rewrite the *sum* of two whole numbers, each less than or equal to 100. Teacher Note: Example: Express $36 + 8$ as $4(9 + 2)$.
Cluster C: Apply and extend previous understandings of numbers to the system of rational numbers.	
AR.Math.Content.6.NS.C.5	Understand that positive and negative numbers are used together to describe quantities having opposite directions or values, explaining the meaning of 0. Teacher Note: Example: Temperature above/below zero, elevation above/below sea level, credits/debits, positive/negative electric charge.
AR.Math.Content.6.NS.C.6	Understand *rational numbers* as points on the *number line* and as *ordered pairs* on a *coordinate plane*. a) Extend the *number line* diagram, both horizontal and vertical, to represent both positive and negative points on the line. ● 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). ● Find and position *integers* and other *rational numbers* on a horizontal or vertical *number line* diagram. b) Extend the *coordinate plane* to represent points in all four *quadrants*. ● Understand signs of numbers in *ordered pairs* as indicating locations in *quadrants* of the *coordinate plane.* ● Understand 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 pairs of *integers* and other *rational numbers* on a *coordinate plane.*

AR.Math.Content.6.NS.C.7	a) Understand ordering of *rational numbers.* ● Interpret statements of *inequality* as statements about the relative position of two numbers on a *number line* diagram (horizontal and vertical). ● Write, interpret, and explain statements of order for *rational numbers* in real-world contexts b) Understand *absolute value* of r*ational 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. Teacher Note: Example: (refers to 6.NS.C.7a) ● Interpret $-4>-9$ as a statement that -4 is located to the right of -9 on a number line oriented from left to right. ● Write $-3^{o}C>-7^{o}C$ to express the fact that -3° C is warmer than -7° C. (refers 6.NS.C.7b) ● For an account balance of -30 dollars, write |-30| = 30 to describe the size of the debt in dollars. ● Recognize that an account balance less than -30 dollars represents a debt greater than 30 dollars.
AR.Math.Content.6.NS.C.8	Graphing and distances: ● Solve real-world mathematical problems by *graphing* points in all four *quadrants* of the *coordinate plane.* ● Use *coordinates* and *absolute value* to find distances between points with the same *x-coordinate* or the same *y-coordinate.* Teacher Note: Remind students that distance cannot be negative. Example: My house is at (-3, 5), the shopping mall is at (-3, -2), and the school is at (3, -2). What is the distance between my house and the shopping mall? The shopping mall and the school?

Expressions and Equations	
Cluster A: Apply and extend previous understandings of arithmetic to algebraic expressions.	
AR.Math.Content.6.EE.A.1	Write and evaluate numerical *expressions* involving whole-number *exponents.*
AR.Math.Content.6.EE.A.2	Write, read, and evaluate *expressions* in which letters (*variables*) stand for numbers. ● Write *expressions* that record operations with numbers and with letters standing for numbers. ● 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. ● Evaluate *expressions* at specific values of their *variables* and 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*). Teacher Note: Examples: ● Express the calculation "subtract *y* from 5" or "*y* less than 5" as $5 - y$. ● 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*.
AR.Math.Content.6.EE.A.3	Apply the properties of operations to generate equivalent expressions and identify when two *expressions* are *equivalent.* Teacher Note: Properties include *associative, commutative*, *distributive*, and *identity.* Examples: ● 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 $3y$.
Cluster B: Reason about and solve one-variable equations and inequalities.	
AR.Math.Content.6.EE.B.5	Understand solving an *equation* or *inequality* as a process of answering the 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. Teacher Note: Include =, ≥ , ≤, >, <, ≠ Examples: ● What numbers could possibly be the solution for $x + 17 = 27$? ● What numbers could possibly be the solution for $x + 17 > 27$? ● What numbers could possibly be the solution for $x + 17 \leq 27$?

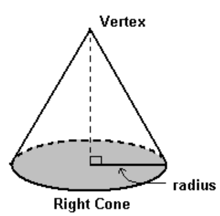
AR.Math.Content.6.EE.B.6	Use *variables* to represent numbers and write *expressions* when solving a real-world or mathematical problem; understand that a *variable* can represent an unknown number or any number in a specified set. Teacher Note: Example: It is 11 degrees warmer than yesterday. Write an expression to represent the temperature today.
AR.Math.Content.6.EE.B.7	Solve real-world and mathematical problems by writing and solving *equations* using all four mathematical operations for all nonnegative *rational numbers*. Teacher Note: While subtraction and division should be used when selecting problems for this standard, problems involving negative numbers, negative *variables*, a *variable* in the denominator, and *complex fractions* are beyond the expectation of this standard. Examples: ● $x - 3 = 10$ ● $\frac{x}{4}$ = 5 or $\frac{1}{4}x = 5$
AR.Math.Content.6.EE.B.8	For real-world or mathematical problems: ● Write an i*nequality* of the form $x > c$, $x \geq c$. $x < c$, or $x \leq c$ to represent a constraint or condition. ● Recognize that inequalities of the form $x > c$, $x \geq c$. $x < c$, or $x \leq c$ have infinitely many *solutions.* ● Represent *solutions* of such inequalities on *number line* diagrams. Teacher Note: Graphs should represent included (closed circle) and not included values (open circle).
Cluster C: Represent and analyze quantitative relationships between dependent and independent variables.	
AR.Math.Content.6.EE.C.9	Use *variables* to represent two quantities in a real-world problem that change in relationship to one another. ● Write a one-step proportional *equation* to express one quantity, thought of as the *dependent variable*, in terms of the other quantity, thought of as the *independent variable.* ● Describe the relationship between the *dependent* and *independent variables* using graphs and tables and relate these to the *equation.* Teacher Note: Recognize that a change in the *independent variable* creates a change in the *dependent variable* (i.e., As x changes, y also changes). Example: In a problem involving motion at a constant speed, list and graph ordered pairs of distances and times, and write the equation $d = 65t$ to represent the relationship between distance and time.

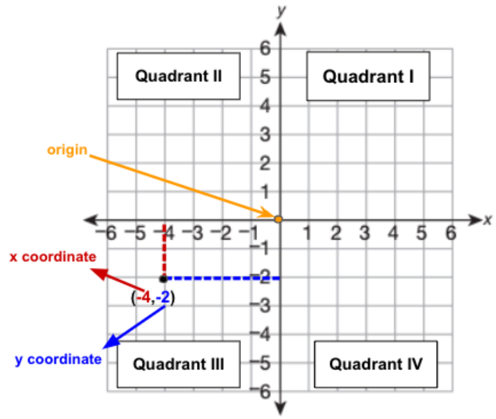
<table>
<tr><th colspan="2">Geometry</th></tr>
<tr><th colspan="2">Cluster A: Solve real-world and mathematical problems involving area, surface area, and volume.</th></tr>
<tr><td>AR.Math.Content.6.G.A.1</td><td>Area:
Find the area of right triangles, other triangles, special quadrilaterals, and polygons by composing into rectangles or decomposing into triangles and familiar polygons.
Apply these strategies in the context of solving real-world and mathematical problems to include solving for an unknown dimension.
Teacher Note:
Trapezoids will be defined to be a quadrilateral with at least one pair of opposite sides parallel, therefore all parallelograms are trapezoids.
Special quadrilaterals include rectangles, squares, parallelograms, trapezoids, and rhombi.</td></tr>
<tr><td>AR.Math.Content.6.G.A.2</td><td>Volume:
Apply and extend previous understandings of the volume of a right rectangular prism to find the volume of right rectangular prisms with fractional edge lengths. Apply this understanding to the context of solving real-world and mathematical problems.
Apply the formulas $V = lwh$ and $V = Bh$ to find volumes of right rectangular prisms including fractional edge lengths in the context of solving real-world and mathematical problems to include solving for an unknown dimension.
Teacher Note: Lower case b represents the base of the figure, capital B represents the area of the base of the figure.</td></tr>
<tr><td>AR.Math.Content.6.G.A.3</td><td>Apply the following strategies in the context of solving real-world and mathematical problems:
Draw polygons in the coordinate plane given coordinates (ordered pair) for the vertices.
Use coordinates to find the length of a side joining points with the same x-coordinate or the same y-coordinate.
Teacher Note: Remind students that distance cannot be negative.</td></tr>
</table>

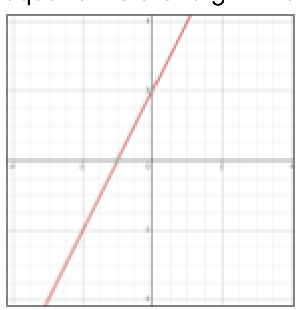
AR.Math.Content.6.G.A.4	Apply the following strategies in the context of solving real-world and mathematical problems: ● Represent *three-dimensional* figures using *nets* made up of rectangles and triangles. ● Use the *nets* to find the *surface area* of these figures. Teacher Note: Figures include *cube, rectangular prism*, *triangular prism,* and *pyramids* (rectangular and triangular base). Example: 

Statistics and Probability	
Cluster A: Develop understanding of statistical variability.	
AR.Math.Content.6.SP.A.1	Recognize a *statistical question* as one that anticipates variability in the *data* related to the question and accounts for it in the answers. Teacher Note: Statistics is also the name for the science of collecting, analyzing, and interpreting *data*. *Data* are the numbers produced in response to a *statistical question* and are frequently collected from surveys or other sources (e.g., documents). Example: “What color are the shoes I am wearing?” only one response can be given. However, “What colors of shoe s are the students in our class wearing?” a variety of responses can be collected.

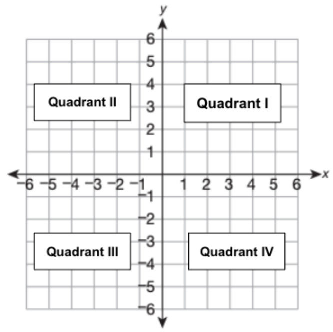
AR.Math.Content.6.SP.A.2	Understand that a set of *data* collected to answer a *statistical question* has a distribution which can be described by its center, spread and overall shape. ● Calculate the *measure of center* for a numerical *data* set (*mean, median, mode).* ● Calculate the measure of *variation* (*range*, *interquartile range*). ● Recognize that number(s) (*mean, median, mode*) summarizes all values within a numerical *data* set. Recognize that a measure of variation (*Interquartile range*, *range*) describes the *data* spread with a single number. Teacher Note: Introduce that *mean absolute deviation (*MAD) is a measure of variation, but students do not need to calculate the MAD. Example: If the mean height of the students in the class is 48 inches, are there any students in the class taller than 48 inches?
Cluster B: Summarize and describe distributions.	
AR.Math.Content.6.SP.B.4	Display numerical *data* in *plots* on a *number line*, including dot plots, histograms, and box plots.
AR.Math.Content.6.SP.B.5	Summarize numerical *data* sets in relation to their context, such as by: ● Reporting the number of observations. ● Describe the *data* being collected including how it was measured and its units of measurement (e.g., Does the *data* match the question?). ● Use the *measure of center* and *measure of variability* to describe any overall pattern and any *outliers* referring back to the context of the *data* set. ● Choose the appropriate measures of center and variability given various *data* distributions referring back to the context of the *data* set. Teacher Note: ● *Mean* is appropriate to use with symmetrical distribution. ● *Median* is appropriate for non-symmetrical distributions and/or distributions with extreme *data* values. ● Instructional focus should be on summarizing and describing *data* distributions.

6 - 8 Glossary	
Absolute Value	A number’s distance from 0 on the number line.
Additive Inverses	Two numbers whose sum is 0 are additive inverses of one another
Area	The measure of the size of the interior of a figure, expressed in square units
Associative Property	A property of real numbers that states that the sum or product of a set of numbers is the same, regardless of how the numbers are grouped. Example: (4 + 8) + 3 = 4 + (8 + 3) or $(4 \bullet 8) \bullet 3 = 4 \bullet (8 \bullet 3)$
Base-Ten Strategy	A strategy based on place value and properties of operations.
Bivariate Data	Data with two variables
Circle	A two-dimensional figure for which all points are the same distance from its center. A circle is identified by its center point.
Circumference	The perimeter of a circle, which is the distance around a circle
Cluster	A grouping within a set of data where the items are similar to or the same as each other.
Coefficient	A constant number or variable by which a variable is multiplied. Examples: $3x + 7$, 3 is the coefficient; $y = mx + b$, m is the coefficient
Commutative Property	A property of real numbers that states that the sum or product of two terms is unaffected by the order in which the terms are added; i.e., the sum remains the same. Example: $5 + 9 = 9 + 5$ or $5 \bullet 9 = 9 \bullet 5$
Complex Fraction	A fraction in which the numerator, denominator, or both are fractions themselves. For example: $\frac{\frac{1}{2}}{\frac{2}{3}}$ or $\frac{2}{\frac{3}{4}}$
Complementary Angles	Two angles (adjacent or nonadjacent) whose sum is 90 degrees.
Computational Fluency	To have efficient and accurate methods for computing. Students exhibit computational fluency when they demonstrate flexibility in the computational methods they choose, understand, and can explain these methods as well as produce accurate answers efficiently.
Cone	A three-dimensional figure that has a circular base and one vertex. A cone has two faces, the circular base and the lateral face. 
Congruent Figures	Geometric figures that have the same size and the same shape. Congruent figures may have different orientations. Examples: Congruent angles have the same degree measure. Congruent line segments have the same length.
Constant of Proportionality	The value of the ratio of two proportional quantities, equivalent to unit rate. Represented as k in the formula $k = \frac{y}{x}$
Constraint	A limiting condition.

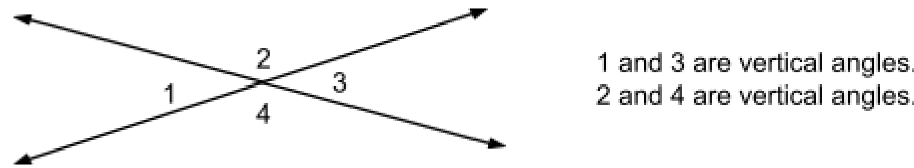
Conversion Factor	A number used to change one set of units to another by multiplying or dividing.
Coordinate Plane	A plane divided by perpendicular number lines creating four quadrants. The perpendicular number lines represent the axes and where they intersect represents the origin (0,0). Points can be identified using coordinates (x,y) found within the quadrants. 
Coordinates	An ordered pair of numbers that identifies a point on a grid, coordinate plane, or map written as (x,y).
Correlation	The relationship between two variables.
Cube	A three-dimensional figure with exactly six congruent, square faces.
Cylinder	A three-dimensional figure with two circular bases that are parallel and congruent. It has three faces, the two circular bases and the lateral face.
Data	Information collected and used to analyze a specific concept or situation.
Dependent Variable	The output variable in a function; the variable whose value depends on the input or independent variable.
Distributive Property	When a single-term expression is being multiplied by a sum or difference, the single-term expression can be multiplied by each term before finding the sum or difference. Examples: $3(7 + 5) = 3 \bullet 7 + 3 \bullet 5$; $w(5 - 2) = 5w - 2w$
Domain	The set of input (x) values for a function.
Double Number Line Diagram	Two number lines used when quantities have different units to easily see there are numerous pairs of numbers in the same ratio.
Edge	The line segment where a base and a lateral face, a base and lateral surface(s), two lateral faces, or two lateral surfaces of a three-dimensional figure intersect.
Equation	A statement that has one number or expression equal to another number or expression, such as 8 + 3 = 11 or 2x- 3 = 7.
Equivalent	Equal in value.
Expanded Form (Exponents)	Expressing exponential expressions using multiplication without an exponent. Example: $x^5 = x \bullet x \bullet x \bullet x \bullet x$
Experimental Probability	The ratio of the number of times an event occurs to the total number of trials or times the activity is performed
Exponent	the power p in an expression of the form a^p used to show repeated multiplication
Expression	A mathematical phrase consisting of numbers, variables, and operations
Factor	1. One or more numbers (or variables) that are multiplied together to get a product (5 and 2 are both factors because

	$5 \bullet 2 = 10$ 2. To break down into the terms that multiply to make the quantity to be factored.
Function	A rule or relationship in which there is exactly one output value for each input value
Function notation	$f(x)$ is a way to represent a function, named f, where the input is represented by x and the output (y-value) is represented by $f(x)$. Example $f(x) = 3x$ is the same as $y = 3x$
Graph (verb)	To show or plot information on a coordinate plan.
Greatest Common Factor	The greatest factor that divides two numbers
Additive Identity Property of 0	The property that asserts the sum of an original addend plus zero is equal to the original addend. Example: $58 + 0 = 58$
Multiplicative Identity Property of 1	The property that asserts the product of an original factor times one is equal to the original factor. Example: $58 \bullet 1 = 58$
Independent Variable	A variable whose values don't depend on changes in other variables
Inequality	A numerical sentence containing one of the symbols: >,<,≥,≤ or ≠ to indicate the relationship between two quantities. Examples: $8 - 2 > 6 \div 3$; $7v \leq 49$; $5 \neq 2 + 2$
Inference (Statistical)	Deriving logical conclusions about a statistical population based on samples.
Integer	A number expressible in the form of *a* or – *a* for some whole number *a*
Interquartile Range	A measure of variation in a set of numerical data; the interquartile range is the distance between the first and third quartiles of the data set
Irrational Number	A number that cannot be expressed as a fraction $\frac{p}{q}$ for any integers *p* and *q*; have decimal expansions that neither terminate nor become periodic.
Least Common Multiple	The smallest number that is exactly divisible by each member of a set of numbers
Like Terms	Two or more terms within an expression or equation that contain the same variables with each of those variables raised to the same power, the numerical coefficients may be different.
Likely Events	A chance event with a probability between 0.5 and 1; the closer the probability is to being 1, the more likely the event is to occur.
Linear Equation	An algebraic equation in which the variables are of the first degree (raised only to the first power). The graph of such an equation is a straight line.  $y = 2x+2$
Linear Expression	An algebraic statement where each term is either a constant or a variable raised to the first power.

Mean	A measure of center in a set of numerical data, computed by adding the values in a slit then dividing by the number of values in the list
Mean Absolute Deviation	A measure of variation in a set of numerical data, computed by adding the distances between each data value and the mean, then dividing by the number of data values
Measure of Center	Statistical measures that are intended to provide numerical representations of the center of a set of numerical data, also called measure of central tendency.
Measure of Variability	Statistical measures that are intended to provide numerical representations of the variability of a set of numerical data.
Median	A measure of center in a set of numerical data; the median of a list of values is the value appearing at the center of a sorted version of the list – or the mean of the two central values, if the list contains an even number of values
Mode	A measure of center in a set of numerical data; the most common value in list of values
Net	Two-dimensional representation of a three-dimensional figure that can be folded up into the three-dimensional figure.
Number Line	A graph that represents the real numbers as ordered points on a line. A number line may be either horizontal (left and right) or vertical (up and down). Starting at zero, the positive numbers progress to the right (or up) and the negative numbers progress to the left (or down).
Order of Operations	A set of rules that define which procedures to perform first in order to evaluate a given expression
Ordered Pairs	A set of two numbers named in an order that matters; represented by (x,y) such that the first number, x, represents the x-coordinate and the second number, y, represents the y-coordinate when the ordered pair is graphed on the coordinate plane; each point on the coordinate plane has a unique ordered pair associated with it.
Outlier	An observation or data point that lies an unusual distance from other values in the data.
Parallel Lines	Two or more distinct lines in the same plane that never intersect, these lines are always equidistant. In the coordinate plane, non-vertical parallel lines have equal slopes.
Percent	A number expressed in relation to 100; represented by the symbol %.
Plot	To place a point(s) on a coordinate plane.
Polygons	A closed two-dimensional figure made up of straight sides.
Population	A group of people, objects, or events that fit a particular description; in statistics, the set from which a sample of data is selected.
Prime	A number greater than 1 with only two factors. The factors of a prime number are 1 and the number itself.
Prime Factorization	A method of writing a composite number as a product of its prime factors.
Prism	A three-dimensional (solid) figure that has two congruent and parallel faces that are polygons called bases. The remaining faces, called lateral faces, are parallelograms (often rectangles). Prisms are named by the shape of their bases.
Probability	A number between 0 and 1 used to quantify likelihood for processes that have uncertain outcomes (tossing a coin, selecting a person at random from a group of people, tossing a ball at a target, or testing for a medical condition)
Product	The resulting quantity when two or more factors are multiplied. (The answer to a multiplication problem.)
Pyramid	A three-dimensional figure whose base is a polygon and the lateral faces are triangles that share a common vertex.
Pythagorean Theorem	The mathematical relationship stating that in any right triangle the square of the length of the hypotenuse is equal to the sum of the squares of the lengths of the two legs. ($a^2+b^2=c^2$)

Quadrants	One of the four sections of a coordinate plane separated by horizontal and vertical axes; they are numbered I, II, III, and IV, counterclockwise from the upper right. 
Quadrilaterals	A polygon with four sides and four angles.
Quotient	The resulting quantity when one quantity (dividend) is divided by another quantity (divisor). The answer to a division problem.
Radius	A line segment with endpoints at the center of a circle and any point on the circle. The length of the radius is equal to one-half the length of the diameter.
Random Sampling	A sample obtained by a selection from a population, in which each element of the population has an equal chance of being selected.
Range	The set of output (y) values for a function.
Rate	A ratio that relates quantities of different units. Examples: miles per hour, price per pound, students per class, heartbeats per minute.
Rate of change/Slope	The ratio of the vertical change compared to the horizontal change between two points on a coordinate plane. Slope is often expressed as $\frac{rise}{run}$ or $\frac{change\ in\ y}{change\ in\ x}$.
Ratio	A comparison of two quantities, *r* and *s,* which can be written: • $\frac{r}{s}$, where *r* is the numerator and *s* is the denominator • *r* : *s* • *r* to *s*
Rational Number	A number that can be written as a ratio of two integers $\frac{a}{b}$, where $b \neq 0$.
Rectangular Prism	A three-dimensional figure whose six faces are rectangles.
Relative Frequency	The ratio of the observed frequency of some outcome to the total frequency of the random experiment.
Repeating Decimal	A decimal in which, after a certain point, one digit or a set of digits repeat themselves an infinite number of times. Repeating digits are designated with an ellipsis or a bar above them. Example: 0.3333... or $0.\overline{3}$

Right Rectangular Pyramid	A three-dimensional figure with a rectangle for a base and four triangular faces whose apex is aligned right above the center of the base.
Sample Space	The set of all possible outcomes for a probability experiment. Sample spaces can be displayed as diagrams, lists, and tables.
Scale Drawing	A drawing with dimensions at a specific ratio relative to the actual size of the object
Scatter Plot	A two-variable data display where points are plotted to show the relationship (correlation) between two variables.
Scientific Notation	A form of writing a number as the product of a power of 10 and a decimal number such that the absolute value of the decimal number is greater than or equal to one and less than ten.
Similar	Two figures are similar if and only if all corresponding angles are congruent and lengths of all corresponding sides are proportional
Simulation	A probability experiment that imitates a real-life activity to find the probability of an event.
Slope/rate of change	The ratio of the vertical change compared to the horizontal change between two points on a coordinate plane. Slope is often expressed as $\frac{rise}{run}$ or $\frac{change\ in\ y}{change\ in\ x}$.
Solution	Any value(s) that make an equation, inequality, or open sentence true.
Sphere	A three-dimensional figure that consists of a set of points in space that are equidistant from a fixed point called the center.
Square Root	The square root of a number is the factor that we can multiply by itself to get that number. The symbol for square root is $\sqrt{\ }$. Finding the square root of a number is the opposite of squaring a number. For example $\sqrt{25} = \pm\ 5$, since $5 \bullet 5 = 25$ and $-\ 5 \bullet -\ 5 = 25$.
Standard Algorithm	Denotes any valid base-ten strategy
Statistical Question	A question that anticipates variability in the data.
Substitution	Use of a numerical value to replace a variable.
Sum	The resulting quantity when two or more addends are combined. The answer to an addition problem.
Supplementary Angles	Two angles(adjacent or nonadjacent) for which the sum of their measures is 180°.
Surface Area	The sum of the areas of all the faces of a three-dimensional (solid) figure or object.
Tape Diagram	A rectangular model that looks like a segment of tape used to illustrate number relationships. Also known as a strip diagram, bar model, fraction strip, or length model.
Term	Terms are constants, variables, or the product or quotient of constant(s) and variable(s).
Theoretical Probability	The number of ways that the event can occur, divided by the total number of outcomes
Three-Dimensional (3D)	An object that has length, width, and height.
Tree Diagram	A diagram that shows the possible outcomes of an event by means of a connected, branching graph.
Transversal	A line that intersect two or more other coplanar lines
Triangular Prism	A three-dimensional figure made up of two triangular bases and three rectangular sides or faces.
Two-Dimensional (2D)	An object that has length and width.
Uniform Probability Model	A probability model which assigns equal probability to all outcomes.
Unit Rate	A comparison of two measurements in which one of the terms has a value of 1
Unlikely	A chance event with a probability between 0 and 0.5; the closer the probability is to being 0, the less likely the event is to

	occur.
Variable	A symbol used to represent an unknown or undetermined value in an expression or equation
Variation	Any change in some quantity due to change in another.
Vertical angles	Nonadjacent, nonoverlapping congruent angles formed by two intersecting lines; share a common vertex 
Vertices	A point where two or more line segments meet. Plural of vertex.
Volume	The amount of space contained in a three-dimensional figure; measured in cubic units.
X Coordinate	The first number in an ordered pair representing the point's distance from the origin along the x-axis.
Y Coordinate	The second number in an ordered pair representing the point's distance from the origin along the y-axis.
Y Intercept	A point where a graph of an equation intersects the y-axis

Appendix

Table 1: Properties of Operations

Associative property of addition	(a + b) + c = a + (b + c)
Commutative property of addition	a + b = b + a
Additive identity property of 0	a + 0 = 0 + a = a
Existence of additive inverses	For every a there exists –a so that *a + (-a) = (-a)* + a = *0*
Associative property of multiplication	(a • b) • c = a • (b • c)
Commutative property of multiplication	a • b = b • a

Multiplicative identity property 1	a • 1 = 1a = a
Existence of multiplication inverses	For every a ≠ 0 there exists 1/*a* so that a • 1/a = 1/a • a = 1
Distributive property of multiplication over addition	a • (b + c) = a • b + a • c

Table 2: Properties of Equality

Reflexive property of equality	a = a
Symmetric property of equality	If a = b, then b = a.
Transitive property of equality	If a = b and b = c, then a = c.
Addition property of equality	If a = b, then a + c = b + c.
Subtraction property of equality	If a = b, then a – c = b – c.
Multiplication property of equality	If a = b, then a • c = b • c.
Division property of equality	If a = b and c ≠ 0, then a ÷ c = b ÷ c.
Substitution property of equality	If a = b, then b may be substituted for a in any expression containing a.

Table 3: Properties of Inequality

Exactly one of the following is true: a < b, a = b, a > b.
If a > b and b > c, then a > c.
If a > b, b < a.
If a > b, then a ± c > b ± c.
If a > b and c > 0, then a • c > b • c.
If a > b and c < 0, then a • c < b • c.
If a > b and c > 0, then a ÷ c > b ÷ c.
If a > b and c < 0, then a ÷ c < b ÷ c.

Table 4: Inequalities

>	greater than
<	less than
=	equal
≈	approximately
≠	not equal to
≥	greater than or equal to
≤	less than or equal to
Used when graphing inequalities	
○	not included (Example: $x > 7$ or $x < 4$)
●	included (Example: $x \geq 5$ or $x \leq 3$)