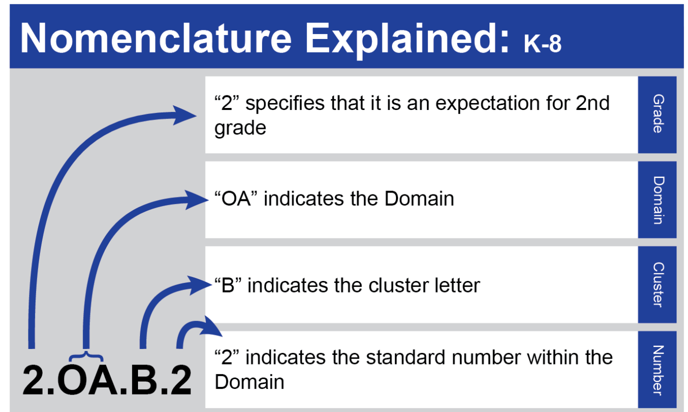
Arkansas Mathematics Standards
Grade 7
2022

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.

Seventh Grade Standards: Overview

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

Ratios and Proportional Relationships – RP
- Analyze proportional relationships and use them to solve real-world and mathematical problems

The Number System – NS
- Apply and extend previous understanding of operations with rational numbers

Expressions and Equations – EE
- Use properties of operations to generate equivalent expressions
- Solve real-life and mathematical problems using numerical and algebraic expressions and equations

Geometry – G
- Draw, construct, and describe geometcial figures and describe the relationships between them
- Solve real-life and mathematical problems involving angle measure, area, surface area, and volume

Statistics and Probability – SP
- Use random sampling to draw inferences about a population
- Draw informal comparative inferences about two populations
- Investigate chance processes and develop, use, and evaluate probability

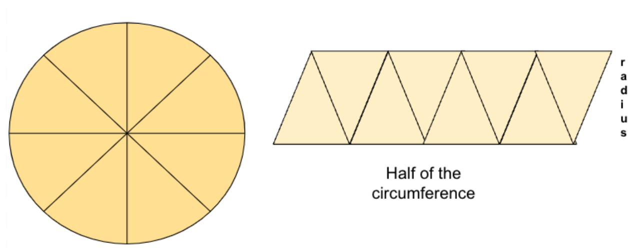
Ratios and Proportional Relationships	
Cluster A: Analyze proportional relationships and use them to solve real-world and mathematical problems	
AR.Math.Content.7.RP.A.1	Compute *unit rate*s associated with *ratios* of fractions including *ratios* of lengths, *areas*, and other quantities measured in like or different units. Teacher Note: Example: If a person walks $\frac{3}{4}$ mile in each $\frac{1}{2}$ hour, compute the *unit rate* as the *complex fraction* $\frac{\frac{3}{4}}{\frac{1}{2}}$ miles per hour, equivalently $1\frac{1}{2}$ miles per hour.
AR.Math.Content.7.RP.A.2	Recognize and represent proportional relationships between quantities. ● Decide whether two quantities are in a proportional relationship (e.g., test for equivalent *ratios* in a table, *graph* on a *coordinate plane* and observe whether the graph is a straight line through the origin). ● Identify *unit rate* (also known as the *constant of proportionality*) in tables, graphs, *equations*, diagrams, and verbal descriptions of proportional relationships. ● Represent proportional relationships by *equations* (e.g., if total cost *t* is proportional to the number *n* of items purchased at a constant price *p*, the relationship between the total cost and the number of items can be expressed as $t = pn$). ● Explain what a point (*x, y*) on the graph of a proportional relationship means in terms of the situation paying special attention to the points (0, 0) and (1, *r*) where *r* is the *unit rate.* Teacher Note: *Constant of proportionality*/*unit rate* builds to *slope* with non-proportional relationships in 8th grade.
AR.Math.Content.7.RP.A.3	Use proportional relationships to solve multi-step *ratio* and *percent* problems. Teacher Note: Examples: Simple interest, tax, markups and markdowns, gratuities and commissions, fees, *percent* increase and decrease

The Number System	
Cluster A: Apply and extend previous understandings of operations with rational numbers.	
AR.Math.Content.7.NS.A.1	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 and show that a number and its opposite have a *sum* of 0 (*additive inverses*). (Refer to first and second examples) ● Understand $p + q$ as a number where *p* is the starting point and *q* represents a distance from *p* in the positive or negative direction depending on whether *q* is positive or negative. (Refer to third example). ● Interpret *sums* of *rational numbers* by describing real-world contexts (e.g., $70 + (-30) = 40$ could mean after earning \$70, \$30 was spent on a new video game, leaving a balance of \$40). ● Understand subtraction of *rational numbers* as adding the *additive inverse* (e.g., $p - q = p + (-q)$). ● 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 (e.g., the distance between -5 and 6 is 11; $\|-5\| + \|6\| = 11$; -5 and 6 are 11 units apart on the *number line*). ● Fluently add and subtract *rational numbers* by applying properties of operations as strategies. Teacher Note: Students have previously used the *commutative*, *associative,* and *additive identity properties* with whole numbers. These properties apply to *rational numbers*. See Appendix Table 1 for properties of operations. Examples: ● A hydrogen atom has 0 charge because its two constituents are oppositely charged. ● Kevin is playing football and lost 5 yards in the first play. He gained 5 yards in the second play. He has a net gain of 0 yards after the second play. $5 + (-5) = 0$. ● $3 + 2$ means beginning at 3, move 2 units to the right and end at the *sum* of 5; $3 + (-2)$ means beginning at 3, move 2 units to the left and end at the *sum* of 1.

AR.Math.Content.7.NS.A.2	Apply and extend previous understandings of multiplication and division of fractions to multiply and divide *rational numbers.* ● Interpret *products* of *rational numbers* by describing real-world contexts; understand the properties of operations, particularly *distributive property,* as strategies of multiplication for all *rational numbers* and the rules for multiplying integers. (Refer to the first example). ● 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*. (Refer to the second example). ● Interpret *quotients* of *rational numbers* by describing real-world contexts.(Refer to the third example). ● Fluently multiply and divide *rational numbers* by applying properties of operations as strategies. ● Discover that the decimal form of a *rational number* terminates in 0s or eventually repeats by converting a *rational number* to a decimal using long division with and without technology. Teacher Note: Students have previously used the *commutative*, *associative*, distributive, and *multiplicative identity property* with whole numbers. These properties apply to *rational numbers.* See Appendix Table 1 for properties of operations. Example: ● Bob owes $7.25 to each of five friends. How much does Bob owe altogether? $5(-7.25) = (-36.25)$ or $5(-7) + 5(-0.25) = (-35) + (-1.25) = (-36.25)$ ● If *p* and *q* are *integers*, then $-(\frac{p}{q}) = \frac{(-p)}{q} = \frac{p}{(-q)}$. ● If the temperature on Sunday was 0 ºF and 5 days later the temperature was -40 ºF, what does -8 represent? How was -8 calculated?
AR.Math.Content.7.NS.A.3	Solve real-world and mathematical problems involving the four operations with *rational numbers* (including *complex fractions).* Teacher Note: Apply operations with *rational numbers* to problems that involve the *order of operations*. Example: It is January, and you want to buy a new tablet. A $50 deposit is required plus the service agreement will deduct $20.25 from your savings every month to pay for it. How much will you have paid towards the tablet at the end of the year? $12(-20.25) + (-50) = (-293)$

Expressions and Equations	
Cluster A: Use properties of operations to generate equivalent expressions.	
AR.Math.Content.7.EE.A.1	Identify, generate, and justify whether *expressions* are *equivalent* by applying previously learned properties of operations as strategies to add, subtract, expand, and *factor linear expressions* with rational *coefficients*. Teacher Note: ● *Coefficients* are limited to *rational numbers* that includes *integers*, positive/negative fractions, and decimals. ● *Substituting* numerical values for *variables* is a strategy/tool to determine whether *expressions* are *equivalent.* Example: Student A thinks $-2(3a-2)+4a$ and $10a-2$ are *equivalent*. Is the student correct? Explain your reasoning.
AR.Math.Content.7.EE.A.2	Understand that rewriting an *expression* in different forms can shed light on a problem and how the quantities in it are related. Teacher Note: Examples: ● $a + 0.05a = 1.05a$ means that "increase by 5%" is the same as "multiply by 1.0"'. ● The perimeter of a square with side length *s* can be written as $s + s + s + s$ or $4s$. ● A shirt is on sale for 35% off or costs 65% of the original price. Write an *expression* using x as the original price. $x - 0.35x$ x or $0.65x$.

Cluster B: Solve real-life and mathematical problems using numerical and algebraic expressions and equations.	
AR.Math.Content.7.EE.B.3	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 numbers in any form. (Refer to the first example.) ● Convert between forms as appropriate. (Refer to the second example.) ● Assess the reasonableness of answers using mental computation and estimation strategies. (Refer to the third example.) Teacher Note: Examples: ● $-\frac{1}{4}(n - 4)$ ● If a woman making \$25 an hour gets a 10% raise, she will make an additional $\frac{1}{10}$ of her salary an hour, or \$2.50, for a new salary of \$27.50. ● If you want to place a towel bar $9\frac{3}{4}$ inches long in the center of a door that is $27\frac{1}{2}$ inches wide, you will need to place the bar about 9 inches from each edge. This estimate can be used as a check on the exact computation.
AR.Math.Content.7.EE.B.4	Use *variables* to represent quantities in a real-world or mathematical problem. ● Construct *equations* and *inequalities* to solve problems by reasoning about the quantities. ● Solve word problems leading to *equations* of these forms $p + q = r$ and $p(x + q) = r$, where *p*, *q*, and *r* are specific *rational numbers*. Solve *equations* of these forms fluently. (Refer to first example). ● Write an algebraic *solution* identifying the sequence of the operations used to mirror the arithmetic *solution* Solve word problems leading to inequalities of the form $px + q > r$, $px + q < r$, $px + q \geq r$, or $px + q \leq r$ where *p*, *q*, and *r* are specific *rational numbers.* (Refer to second example). ● *Graph* the solution set of the *inequality* and interpret it in the context of the problem. Teacher Note: Examples: ● The perimeter of a rectangle is 36 cm. Its length is 4 cm. What is its width? Subtract $2 \cdot 4$ from 36 and divide by 2; $(2 \cdot 4) + 2w = 36$. ● As a salesperson, you are paid \$50 per week plus \$3 per sale. This week you want your pay to be at least \$100. Write an *inequality* for the number of sales you need to make and describe the *solutions*.

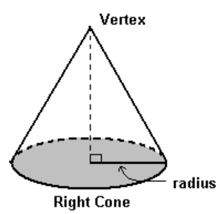
Geometry	
Cluster A: Draw, construct, and describe geometrical figures and describe the relationships between them.	
AR.Math.Content.7.G.A.1	Solve problems involving *scale drawings* of geometric figures, including computing actual lengths and *areas* from a *scale drawing* and reproducing a *scale drawing* at a different scale. Teacher Note: This concept ties into *ratio* and proportion.
AR.Math.Content.7.G.A.2	Draw (freehand, utilize ruler and protractor, and with technology) geometric shapes with given conditions. Focus on constructing triangles given three measures of angles or sides and noticing when the conditions determine a unique triangle, more than one triangle, or no triangle. Teacher Note: The focus should be on constructing triangles; additional time can be spent on drawing different shapes.
AR.Math.Content.7.G.A.3	Describe the *2D figures* that result from slicing *3D figures,* with or without technology, as in plane sections of right *rectangular prisms* and *right rectangular pyramids.* Teacher Note: Slicing should not be limited to only parallel and perpendicular to the base.
Cluster B: Solve real-life and mathematical problems involving angle measure, area, surface area and volume.	
AR.Math.Content.7.G.B.4	Understand the area and circumference of a circle. ● Give an informal derivation of the relationship between the *circumference* and *area* of a *circle.* ● Understand the formulas for the *area* and *circumference* of a *circle* and use them to solve problems. Teacher Note: An example of an informal derivation could include cutting a *circle* into increasingly smaller sectors and rearranging the sectors into a parallelogram to describe the *area* using the dimensions of the *circle*. Example: 
AR.Math.Content.7.G.B.5	Use facts about *supplementary, complementary, vertical,* and adjacent angles in a multi-step problem to write and solve *equations* for an unknown angle in a figure.

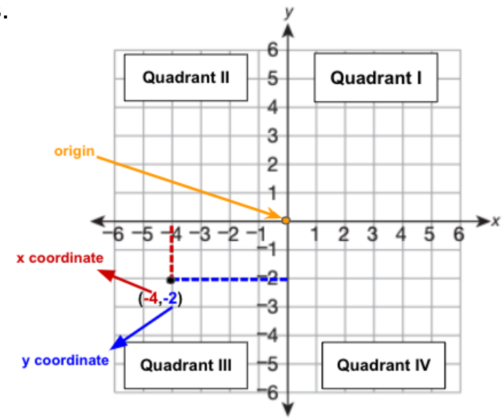
AR.Math.Content.7.G.B.6	Solve real-world and mathematical problems involving the *area* of *2D objects* and the *volume* and *surface area* of *3D* objects composed of triangles, *quadrilaterals, polygons*, *cubes*, and right *prisms.* Teacher Note: Students are building on the knowledge of shapes (2D & 3D) from previous grade levels such as *area, volume, surface area*, and composite shapes.

Statistics and Probability	
Cluster A: Use random sampling to draw inferences about a population.	
AR.Math.Content.7.SP.A.1	Understand that: ● Statistics can be used to gain information about a *population* by examining a sample of the *population.* ● Generalizations about a *population* from a sample are valid only if the sample is representative of that *population.* ● *Random sampling* tends to produce representative samples and support valid *inferences.* Teacher Note: Sampling is a statistical tool to examine attributes of a given *population* without analyzing the entire *population*.
AR.Math.Content.7.SP.A.2	Use *data* from a *random sample* to draw *inferences* about a *population*. Generate multiple samples (or simulated samples) of the same size to gauge the *variation* in estimates or predictions. Teacher Note: Example: Estimate the *mean* word length in a book by randomly sampling words from the book or predict the winner of a school election based on randomly sampled survey *data*. Gauge how far off the estimate or prediction might be.
Cluster B: Draw informal comparative inferences about two populations.	
AR.Math.Content.7.SP.B.3	Draw conclusions between two numerical *data* distributions with similar variability using: ● The difference between the centers as a *measure of variability* such as *mean*, *median*, or *mode.* ● Measures of *variation* such as *interquartile range* or *mean absolute deviation.* Teacher Note: Example: The *mean* height of players on the basketball team is 10 cm greater than the *mean* height of players on the soccer team, about twice the variability on either team; on a dot plot, the separation between the two distributions of heights is noticeable.

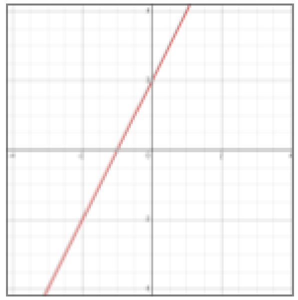
AR.Math.Content.7.SP.B.4	Draw informal comparative *inferences* about two *populations* using measures of center (*mean, median,* and/or *mode*) and measures of variability (*range, interquartile range,* and/or *mean absolute deviation*) for numerical *data* from *random samples.* Teacher Note: This standard is a natural learning progression from the previous standard and is the justification and the reasoning behind the *data* discovered in the previous standard. Example: Decide whether the words in a chapter of a seventh-grade science book are generally longer than those in a fourth-grade science book chapter.
Cluster C: Investigate chance processes and develop, use, and evaluate probability models.	
AR.Math.Content.7.SP.C.5	Understand that: ● The *probability* of a chance event is a number between 0 and 1 that expresses the likelihood of the event occurring. ● A *probability* near 0 indicates an u*nlikely 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.* Teacher note: A *probability* of 1 is certain and 0 is impossible.
AR.Math.Content.7.SP.C.6	Approximate the *probability* of a chance event. ● Collect *data,* ● Observe its long-run r*elative frequency,* and ● Predict the approximate *relative frequency* given the *probability.* Teacher Note: Emphasis should be given to the relationship between *experimental* and *theoretical probability*. Example: When rolling a number cube 600 times, predict that a 3 or 6 would be rolled roughly 200 times, but probably not exactly 200 times.

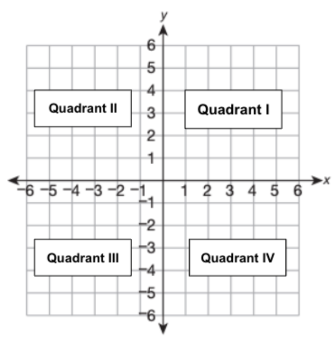
AR.Math.Content.7.SP.C.7	Develop a *probability* model and use it to find probabilities of events. Compare probabilities from a model to observed frequencies. If the agreement is not good, explain possible sources of the discrepancy. ● Develop a *uniform probability model,* assigning equal *probability* to all outcomes, and use the model to determine probabilities of events. (Refer to the first example). ● Develop a probability model, which may not be uniform, by observing frequencies in *data* generated from a chance process. (Refer to the second example.) Teacher Note: Examples: ● If a student is selected at random from a class of 6 girls and 4 boys, the *probability* that Jane will be selected is .10 and the *probability* that a girl will be selected is .60. ● Find the approximate *probability* that a spinning penny will land heads up or that a tossed paper cup will land open-end down. Do the outcomes for the spinning penny appear to be equally likely based on the observed frequencies?
AR.Math.Content.7.SP.C.8	Find probabilities of compound events using organized lists, tables, *tree diagrams*, and *simulation*. ● Understand that, just as with simple events, the *probability* of a compound event is the fraction of outcomes in the s*ample space* for which the compound event occurs. ● Represent *sample spaces* for compound events using methods such as organized lists, tables, and *tree diagrams.* ● Identify the outcomes in the *sample space* which compose the event. ● Design and use a *simulation* to generate frequencies for compound events. (Refer to the example.) Teacher Note: Example: What is the frequency of pulling a red card from a deck of cards and rolling a 5 on a die?

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 $k = \frac{y}{x}$

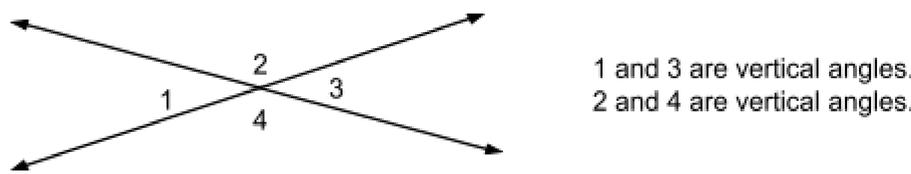
Constraint	A limiting condition.
Conversion Factor	A number used to change one set of units to another by multiplying or dividing.
Coordinate Plane	A plane divided by perpendicular number lines creating four quadrants. The perpendicular number lines represent the axes and where they intersect represents 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.

	
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 $x \leq 3$)