Arkansas Tutorials are designed specifically for the Arkansas Standards found in the Curriculum Framework documents to prepare students for the ACT Aspire in English, reading, writing, math and science tests.

Math Tutorials offer targeted instruction, practice and review designed to develop computational fluency, deepen conceptual understanding, and apply mathematical practices. They automatically identify and address learning gaps down to elementary-level content, using adaptive remediation to bring students to grade-level no matter where they start. Students engage with the content in an interactive, feedback-rich environment as they progress through standards-aligned modules. By constantly honing the ability to apply their knowledge in abstract and real world scenarios, students build the depth of knowledge and higher order skills required to demonstrate their mastery when put to the test.

In each module, the Learn It and Try It make complex ideas accessible to students through focused content, modeled logic and process, multi-modal representations, and personalized feedback as students reason through increasingly challenging problems. The Review It offers a high impact summary of key concepts and relates those concepts to students' lives. The Test It assesses students' mastery of the module's concepts, providing granular performance data to students and teachers after each attempt. To help students focus on the content most relevant to them, unit-level pretests and posttests can quickly identify where students are strong and where they're still learning.

1. RATE, RATIO, AND PROPORTION

- **UNIT RATES**
  - **AR.Math.Content.7.RP.A.1** *Compute unit rates associated with ratios of fractions, including ratios of lengths, areas, and other quantities measured in like or different units.*
  - **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., by testing for equivalent ratios in a table or graphing on a coordinate plane and observing whether the graph is a straight line through the origin). Identify 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, with special attention to the points (0, 0) and (1, r) where r is the unit rate.*

- **IDENTIFYING PROPORTIONAL RELATIONSHIPS**
  - **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., by testing for equivalent ratios in a table or graphing on a coordinate plane and observing whether the graph is a straight line through the origin). Identify 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, with special attention to the points (0, 0) and (1, r) where r is the unit rate.*
  - **AR.Math.Content.7.RP.A.3** *Use proportional relationships to solve multi-step ratio and percent problems.*

- **USING PROPORTIONS TO SOLVE PROBLEMS**
  - **AR.Math.Content.7.RP.A.3** *Use proportional relationships to solve multi-step ratio and percent problems.*
  - **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., by testing for equivalent ratios in a table or graphing on a coordinate plane and observing whether the graph is a straight line through the origin). Identify 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, with special attention to the points (0, 0) and (1,*

r) where r is the unit rate.

2. PROPORTIONAL REASONING

- **ANALYZING PROPORTIONAL RELATIONSHIPS**
  - **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., by testing for equivalent ratios in a table or graphing on a coordinate plane and observing whether the graph is a straight line through the origin). Identify 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, with special attention to the points (0, 0) and (1, r) where r is the unit rate.*
  - **AR.Math.Content.7.RP.A.1** *Compute unit rates associated with ratios of fractions, including ratios of lengths, areas, and other quantities measured in like or different units.*

- **REPRESENTING PROPORTIONAL RELATIONSHIPS**
  - **AR.Math.Content.7.RP.A.3** *Use proportional relationships to solve multi-step ratio and percent problems.*
  - **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., by testing for equivalent ratios in a table or graphing on a coordinate plane and observing whether the graph is a straight line through the origin). Identify 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, with special attention to the points (0, 0) and (1, r) where r is the unit rate.*

3. ADDITION AND SUBTRACTION OF RATIONAL NUMBERS

- **ADDING 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) (e.g., A hydrogen atom has 0 charge because its two constituents are oppositely charged.). 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. Interpret sums of rational numbers by describing real-world contexts (e.g., 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. 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, 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 and 6 are 11 units apart on the number line.) Fluently add and subtract rational numbers by applying properties of operations as strategies.*
  - **AR.Math.Content.7.NS.A.3** *Solve real-world and mathematical problems involving the four operations with rational numbers, including but not limited to complex fractions.*
  - **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 with numbers in any form (e.g., -(1/4)(n-4)). Convert between forms as appropriate (e.g., If a woman making $25 an hour gets a 10% raise, she will make an additional 1/10 of her salary an hour, or $2.50, for a new salary of $27.50.). Assess the reasonableness of answers using mental computation and estimation strategies (e.g., If you want to place a towel bar 9 3/4 inches long in the center of a door that is 27 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.).*

- **SUBTRACTING 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) (e.g., A hydrogen atom has 0 charge because its two constituents are oppositely charged.). 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. Interpret sums of rational numbers by describing real-world contexts (e.g., 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. 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, 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 and 6 are 11 units apart on the number line.) Fluently add and subtract rational numbers by applying properties of operations as strategies.

- **AR.Math.Content.7.NS.A.3** *Solve real-world and mathematical problems involving the four operations with rational numbers, including but not limited to complex fractions.*
- **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 with numbers in any form (e.g., -(1/4)(n-4)). Convert between forms as appropriate (e.g., If a woman making $25 an hour gets a 10% raise, she will make an additional 1/10 of her salary an hour, or $2.50, for a new salary of $27.50.). Assess the reasonableness of answers using mental computation and estimation strategies (e.g., If you want to place a towel bar 9 3/4 inches long in the center of a door that is 27 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.).*

- **USING PROPERTIES TO ADD AND SUBTRACT RATIONAL NUMBERS**
  - **AR.Math.Content.7.NS.A.3** *Solve real-world and mathematical problems involving the four operations with rational numbers, including but not limited to complex fractions.*
  - **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) (e.g., A hydrogen atom has 0 charge because its two constituents are oppositely charged.). 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. Interpret sums of rational numbers by describing real-world contexts (e.g., 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. 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, 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 and 6 are 11 units apart on the number line.) Fluently add and subtract rational numbers by applying properties of operations as strategies.*
  - **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 with numbers in any form (e.g., -(1/4)(n-4)). Convert between forms as appropriate (e.g., If a woman making $25 an hour gets a 10% raise, she will make an additional 1/10 of her salary an hour, or $2.50, for a new salary of $27.50.). Assess the reasonableness of answers using mental computation and estimation strategies (e.g., If you want to place a towel bar 9 3/4 inches long in the center of a door that is 27 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.).*

4. MULTIPLICATION AND DIVISION OF RATIONAL NUMBERS

- **MULTIPLYING RATIONAL NUMBERS**
  - **AR.Math.Content.7.NS.A.3** *Solve real-world and mathematical problems involving the four operations with rational numbers, including but not limited to complex fractions.*
  - **AR.Math.Content.7.NS.A.2** *Apply and extend previous understandings of multiplication and division and of fractions to multiply and divide rational numbers. Understand that multiplication is extended from fractions to all rational numbers by requiring that operations continue to satisfy the properties of operations, particularly the distributive property, and the rules for multiplying signed numbers. Interpret products of rational numbers by describing real-world contexts. 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 (e.g., If p and q are integers, then -(p/q) = (-p)/q = p/(-q).). Interpret quotients of rational numbers by describing real-world contexts. Fluently multiply and divide rational numbers by applying properties of operations as strategies. Convert a fraction to a decimal using long division. Know that the decimal form of a fraction terminates in 0s or eventually repeats.*
  - **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 with numbers in any form (e.g., -(1/4)(n-4)). Convert between forms as appropriate (e.g., If a woman making $25 an hour gets a 10% raise, she will make an additional 1/10 of her salary an hour, or $2.50, for a new salary of $27.50.). Assess the reasonableness of answers using mental computation and estimation strategies (e.g., If you want to place a towel bar 9 3/4 inches long in the center of a door that is 27 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.).*

- **DIVIDING RATIONAL NUMBERS**
  - **AR.Math.Content.7.NS.A.2** *Apply and extend previous understandings of multiplication and division and of fractions to multiply and divide rational numbers. Understand that multiplication is extended from fractions to all rational numbers by requiring that operations continue to satisfy the properties of operations, particularly the distributive property, and the rules for multiplying signed numbers. Interpret products of rational numbers by describing real-world contexts. 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 (e.g., If p and q are integers, then -(p/q) = (-p)/q = p/(-q).). Interpret quotients of rational numbers by describing real-world contexts. Fluently multiply and divide rational numbers by applying properties of operations as strategies. Convert a fraction to a decimal using long division. Know that the decimal form of a fraction terminates in 0s or eventually repeats.*
  - **AR.Math.Content.7.NS.A.3** *Solve real-world and mathematical problems involving the four operations with rational numbers, including but not limited to complex fractions.*
  - **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 with numbers in any form (e.g., -(1/4)(n-4)). Convert between forms as appropriate (e.g., If a woman making $25 an hour gets a 10% raise, she will make an additional 1/10 of her salary an hour, or $2.50, for a new salary of $27.50.). Assess the reasonableness of answers using mental computation and estimation strategies (e.g., If you want to place a towel bar 9 3/4 inches long in the center of a door that is 27 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.).*

- **USING PROPERTIES TO MULTIPLY AND DIVIDE RATIONAL NUMBERS**
  - **AR.Math.Content.7.NS.A.3** *Solve real-world and mathematical problems involving the four operations with rational numbers, including but not limited to complex fractions.*
  - **AR.Math.Content.7.NS.A.2** *Apply and extend previous understandings of multiplication and division and of fractions to multiply and divide rational numbers. Understand that multiplication is extended from fractions to all rational numbers by requiring that operations continue to satisfy the properties of operations, particularly the distributive property, and the rules for multiplying signed numbers. Interpret products of rational numbers by describing real-world contexts. 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 (e.g., If p and q are integers, then -(p/q) = (-p)/q = p/(-q).). Interpret quotients of rational numbers by describing real-world contexts. Fluently multiply and divide rational numbers by applying properties of operations as strategies. Convert a fraction to a decimal using long division. Know that the decimal form of a fraction terminates in 0s or eventually repeats.*
  - **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 with numbers in any form (e.g., -(1/4)(n-4)). Convert between forms as appropriate (e.g., If a woman making $25 an hour gets a 10% raise, she will make an additional 1/10 of her salary an hour, or $2.50, for a new salary of $27.50.). Assess the reasonableness of answers using mental computation and estimation strategies (e.g., If you want to place a towel bar 9 3/4 inches long in the center of a door that is 27 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.).*

5. WORKING WITH RATIONAL NUMBERS

- **EXPRESSING RATIONAL NUMBERS IN DECIMAL FORM**
  - **AR.Math.Content.7.NS.A.2** *Apply and extend previous understandings of multiplication and division and of fractions to multiply and divide rational numbers. Understand that multiplication is extended from fractions to all rational numbers by requiring that operations continue to satisfy the properties of operations, particularly the distributive property, and the rules for multiplying signed numbers. Interpret products of rational numbers by describing real-world contexts. 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 (e.g., If p and q are integers, then -(p/q) = (-p)/q = p/(-q).). Interpret quotients of rational numbers by describing real-world contexts. Fluently multiply and divide rational numbers by applying properties of operations as strategies. Convert a fraction to a decimal using long division. Know that the decimal form of a fraction terminates in 0s or eventually repeats.*
  - **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 with numbers in any form (e.g., -(1/4)(n-4)). Convert between forms as appropriate (e.g., If a woman making $25 an hour gets a 10% raise, she will make an additional 1/10 of her salary an hour, or $2.50, for a new salary of $27.50.). Assess the reasonableness of answers using mental computation and estimation strategies (e.g., If you want to place a towel bar 9 3/4 inches long in the center of a door that is 27 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.).*

- **USING OPERATIONS ON RATIONAL NUMBERS TO SOLVE PROBLEMS**

- **AR.Math.Content.7.NS.A.3** *Solve real-world and mathematical problems involving the four operations with rational numbers, including but not limited to complex fractions.*
- **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) (e.g., A hydrogen atom has 0 charge because its two constituents are oppositely charged.). 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. Interpret sums of rational numbers by describing real-world contexts (e.g., 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. 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, 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 and 6 are 11 units apart on the number line.) Fluently add and subtract rational numbers by applying properties of operations as strategies.*
- **AR.Math.Content.7.NS.A.2** *Apply and extend previous understandings of multiplication and division and of fractions to multiply and divide rational numbers. Understand that multiplication is extended from fractions to all rational numbers by requiring that operations continue to satisfy the properties of operations, particularly the distributive property, and the rules for multiplying signed numbers. Interpret products of rational numbers by describing real-world contexts. 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 (e.g., If p and q are integers, then -(p/q) = (-p)/q = p/(-q).). Interpret quotients of rational numbers by describing real-world contexts. Fluently multiply and divide rational numbers by applying properties of operations as strategies. Convert a fraction to a decimal using long division. Know that the decimal form of a fraction terminates in 0s or eventually repeats.*
- **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 with numbers in any form (e.g., -(1/4)(n-4)). Convert between forms as appropriate (e.g., If a woman making $25 an hour gets a 10% raise, she will make an additional 1/10 of her salary an hour, or $2.50, for a new salary of $27.50.). Assess the reasonableness of answers using mental computation and estimation strategies (e.g., If you want to place a towel bar 9 3/4 inches long in the center of a door that is 27 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.).*

6. ALGEBRAIC EXPRESSIONS

- **SIMPLIFYING AND REWRITING ALGEBRAIC EXPRESSIONS**
  - **AR.Math.Content.7.EE.A.1** *Apply properties of operations as strategies to add, subtract, expand, and factor linear expressions with rational coefficients.*
  - **AR.Math.Content.7.EE.A.2** *Understand how the quantities in a problem are related by rewriting an expression in different forms.*

- **SOLVING MULTI-STEP PROBLEMS WITH RATIONAL NUMBERS**
  - **AR.Math.Content.7.NS.A.3** *Solve real-world and mathematical problems involving the four operations with rational numbers, including but not limited to complex fractions.*
  - **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) (e.g., A hydrogen atom has 0 charge because its two constituents are oppositely charged.). 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. Interpret sums of rational numbers by describing real-world contexts (e.g., 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. 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, 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 and 6 are 11 units apart on the number line.) Fluently add and subtract rational numbers by applying properties of operations as strategies.*
  - **AR.Math.Content.7.NS.A.2** *Apply and extend previous understandings of multiplication and division and of fractions to multiply and divide rational numbers. Understand that multiplication is extended from fractions to all rational numbers by requiring that operations continue to satisfy the properties of operations, particularly the distributive property, and the rules for multiplying signed numbers. Interpret products of rational numbers by describing real-world contexts. 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 (e.g., If p and q are integers, then -(p/q) = (-p)/q = p/(-q).). Interpret quotients of rational numbers by describing real-world contexts. Fluently multiply and divide rational numbers by applying properties of operations as strategies. Convert a*

fraction to a decimal using long division. Know that the decimal form of a fraction terminates in 0s or eventually repeats.

- **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 with numbers in any form (e.g., -(1/4)(n-4)). Convert between forms as appropriate (e.g., If a woman making $25 an hour gets a 10% raise, she will make an additional 1/10 of her salary an hour, or $2.50, for a new salary of $27.50.). Assess the reasonableness of answers using mental computation and estimation strategies (e.g., If you want to place a towel bar 9 3/4 inches long in the center of a door that is 27 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.A.2** *Understand how the quantities in a problem are related by rewriting an expression in different forms.*

7. EQUATIONS AND INEQUALITIES

SOLVING TWO-STEP EQUATIONS

- **AR.Math.Content.7.EE.B.4** *Use variables to represent quantities in a real-world or mathematical problem. Construct simple equations and inequalities to solve problems by reasoning about the quantities. Solve word problems leading to equations of these forms px + q = r and p(x + q) = r, where p, q, and r are specific rational numbers. Solve equations of these forms fluently. Write an algebraic solution identifying the sequence of the operations used to mirror the arithmetic solution (e.g., The perimeter of a rectangle is 54 cm. Its length is 6 cm. What is its width? Subtract 2*6 from 54 and divide by 2; (2*6) + 2w = 54). Solve word problems leading to inequalities of the form px + q > r or px + q < r, where p, q, and r are specific rational numbers. Graph the solution set of the inequality and interpret it in the context of the problem (e.g., 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.).*

SOLVING LINEAR INEQUALITIES

- **AR.Math.Content.7.EE.B.4** *Use variables to represent quantities in a real-world or mathematical problem. Construct simple equations and inequalities to solve problems by reasoning about the quantities. Solve word problems leading to equations of these forms px + q = r and p(x + q) = r, where p, q, and r are specific rational numbers. Solve equations of these forms fluently. Write an algebraic solution identifying the sequence of the operations used to mirror the arithmetic solution (e.g., The perimeter of a rectangle is 54 cm. Its length is 6 cm. What is its width? Subtract 2*6 from 54 and divide by 2; (2*6) + 2w = 54). Solve word problems leading to inequalities of the form px + q > r or px + q < r, where p, q, and r are specific rational numbers. Graph the solution set of the inequality and interpret it in the context of the problem (e.g., 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.).*

8. DRAWING, CONSTRUCTING, AND EXPLORING GEOMETRIC FIGURES

SCALE DRAWINGS

- **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.*

GEOMETRIC DRAWINGS

- **AR.Math.Content.7.G.A.2** *Draw (freehand, with ruler and protractor, and with technology) geometric shapes with given conditions. Given three measures of angles or sides of a triangle, notice when the conditions determine a unique triangle, more than one triangle, or no triangle. Differentiate between regular and irregular polygons.*
- **AR.Math.Content.7.G.A.3** *Describe the two-dimensional figures that result from slicing three-dimensional figures, as in plane sections of right rectangular prisms and right rectangular pyramids.*

CROSS-SECTIONS OF GEOMETRIC SOLIDS

- **AR.Math.Content.7.G.A.3** *Describe the two-dimensional figures that result from slicing three-dimensional figures, as in plane sections of right rectangular prisms and right rectangular pyramids.*

9. GEOMETRY IN TWO AND THREE DIMENSIONS

CIRCLES

- **AR.Math.Content.7.G.B.4** *Know the formulas for the area and circumference of a circle and use them to solve problems.*

Give an informal derivation of the relationship between the circumference and area of a circle.

- **ANGLE RELATIONSHIPS**
  - **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 simple equations for an unknown angle in a figure.*

- **AREA, VOLUME, AND SURFACE AREA**
  - **AR.Math.Content.7.G.B.6** *Solve real-world and mathematical problems involving area of two-dimensional objects and volume and surface area of three-dimensional objects composed of triangles, quadrilaterals, polygons, cubes, and right prisms.*

10. STATISTICS AND SAMPLING

- **POPULATIONS AND SAMPLES**
  - **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.*
  - **AR.Math.Content.7.SP.A.2** *Use data from a random sample to draw inferences about a population with a specific characteristic. Generate multiple samples (or simulated samples) of the same size to gauge the variation in estimates or predictions.*
  - **AR.Math.Content.7.SP.B.4** *Draw informal comparative inferences about two populations using measures of center and measures of variability for numerical data from random samples.*

- **COMPARING DATA SETS VISUALLY**
  - **AR.Math.Content.7.SP.B.3** *Draw conclusions about the degree of visual overlap of two numerical data distributions with similar variability such as Interquartile Range or Mean Absolute Deviation, expressing the difference between the centers as a multiple of a measure of variability such as Mean, Median, or Mode.*
  - **AR.Math.Content.7.SP.B.4** *Draw informal comparative inferences about two populations using measures of center and measures of variability for numerical data from random samples.*
  - **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 with numbers in any form (e.g., -(1/4)(n-4)). Convert between forms as appropriate (e.g., If a woman making $25 an hour gets a 10% raise, she will make an additional 1/10 of her salary an hour, or $2.50, for a new salary of $27.50.). Assess the reasonableness of answers using mental computation and estimation strategies (e.g., If you want to place a towel bar 9 3/4 inches long in the center of a door that is 27 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.).*

- **USING STATISTICAL MEASURES TO COMPARE DATA SETS**
  - **AR.Math.Content.7.SP.B.3** *Draw conclusions about the degree of visual overlap of two numerical data distributions with similar variability such as Interquartile Range or Mean Absolute Deviation, expressing the difference between the centers as a multiple of a measure of variability such as Mean, Median, or Mode.*
  - **AR.Math.Content.7.SP.B.4** *Draw informal comparative inferences about two populations using measures of center and measures of variability for numerical data from random samples.*

11. PROBABILITY 1

- **PROBABILITY**
  - **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 unlikely event, a probability around 1/2 indicates an event that is neither unlikely nor likely, and a probability near 1 indicates a likely event.*
  - **AR.Math.Content.7.SP.C.6** *Collect data to approximate the probability of a chance event. Observe its long-run relative frequency. Predict the approximate relative frequency given the probability.*
  - **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.*

- **AR.Math.Content.7.SP.A.2** *Use data from a random sample to draw inferences about a population with a specific characteristic. Generate multiple samples (or simulated samples) of the same size to gauge the variation in estimates or predictions.*

- **CALCULATING PROBABILITY**
  - **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 (e.g., 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.). Develop a probability model, which may not be uniform, by observing frequencies in data generated from a chance process (e.g., 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 sample 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. Generate frequencies for compound events using a simulation. (e.g., What is the frequency of pulling a red card from a deck of cards and rolling a 5 on a die?).*
  - **AR.Math.Content.7.SP.C.6** *Collect data to approximate the probability of a chance event. Observe its long-run relative frequency. Predict the approximate relative frequency given the probability.*

12. PROBABILITY 2

- **PROBABILITY OF COMPOUND EVENTS**
  - **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 unlikely event, a probability around 1/2 indicates an event that is neither unlikely nor likely, and a probability near 1 indicates a likely event.*
  - **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 sample 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. Generate frequencies for compound events using a simulation. (e.g., What is the frequency of pulling a red card from a deck of cards and rolling a 5 on a die?).*

- **SIMULATIONS**
  - **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 sample 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. Generate frequencies for compound events using a simulation. (e.g., What is the frequency of pulling a red card from a deck of cards and rolling a 5 on a die?).*
  - **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 unlikely event, a probability around 1/2 indicates an event that is neither unlikely nor likely, and a probability near 1 indicates a likely event.*