2003/2010 ACOS MATHEMATICS CONTENT CORRELATION
GRADE 8

2003 ACOS		2010 ACOS
CURRENT ALABAMA CONTENT PLACEMENT		**2010 GRADE 8 CONTENT**
8.1	**Use various strategies and operations to solve problems involving real numbers.**	**CONTENT NO LONGER ADDRESSED IN GRADE 8**
8.1.B.1	**Using alternative representations of rational numbers**	**CONTENT NO LONGER ADDRESSED IN GRADE 8**
8.1.B.2	**Applying GCF, LCM, and prime and composite numbers, including justification for the reasonableness of results, when working with rational numbers**	**CONTENT NO LONGER ADDRESSED IN GRADE 8**
8.1.B.3	**Applying proportional reasoning**	**CONTENT NOW ADDRESSED IN GRADE 7:** **7.3. Use proportional relationships to solve multistep ratio and percent problems. [7-RP3]**
8.1.B.4	**Using vocabulary associated with sets, including *union* and *intersection***	**CONTENT NO LONGER ADDRESSED IN GRADE 8**
8.1.B.5	**Determining whether a number is rational or irrational**	8.1. Know that numbers that are not rational are called irrational. Understand informally that every number has a decimal expansion; for rational numbers show that the decimal expansion repeats eventually, and convert a decimal expansion which repeats eventually into a rational number. [8-NS1] 8.2. Use rational approximations of irrational numbers to compare the size of irrational numbers, locate them approximately on a number line diagram, and estimate the value of expressions. [8-NS2] 8.4 Use square root and cube root symbols to represent solutions to equations of the form x^2 = p and x^3 = p, where p is a positive rational number. Evaluate square roots of small perfect squares and cube roots of small perfect cubes. Know that √2 is irrational. [8-EE2]
8.1.B.6	**Demonstrating computational fluency with operations on rational numbers**	**CONTENT NOW ADDRESSED IN GRADE 7:** **4d. Apply properties of operations as strategies to add and subtract rational numbers. [7-NS1d]** **5c. Apply properties of operations as strategies to multiply and divide rational numbers. [7-NS2c]**
8.2	**Simplify expressions containing natural number exponents by applying one or more of the laws of exponents.**	8.3 . Know and apply the properties of integer exponents to generate equivalent numerical expressions. [8-EE1] 8.4. Use square root and cube root symbols to represent solutions to equations of the form x^2 = p and x^3 = p, where p is a positive rational number. Evaluate square roots of small perfect squares and cube roots of small perfect cubes. Know that √2 is irrational. [8-EE2]
8.2.B.1	**Writing numbers using scientific notation**	8.5. Use numbers expressed in the form of a single digit times an integer power of 10 to estimate very large or very small quantities, and to express how many times as much one is than the other. [8-EE3] 8.6. Perform operations with numbers expressed in scientific notation, including problems where both decimal and scientific notation are used. Use scientific notation and choose units of appropriate size for measurements of very large or very small quantities[8-EE4]

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8.3	**Use order of operations to evaluate and simplify algebraic expressions.**	8.6. Perform operations with numbers expressed in scientific notation, including problems where both decimal and scientific notation are used. Use scientific notation and choose units of appropriate size for measurements of very large or very small quantities [8-EE4]
8.3.B.1	**Applying the substitution principle**	**CONTENT NOW ADDRESSED IN GRADE 6:** **6.13c. Evaluate expressions at specific values for their variables. Include expressions that arise from formulas 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). ' [6-EE2c]** **6.15. Identify when two expressions are equivalent (i.e., when the two expressions name the same number regardless of which value is substituted into them). [6-EE4]**
8.3.B.2	**Applying the properties of operations on rational numbers to evaluate and simplify algebraic expressions**	8.4. Use square root and cube root symbols to represent solutions to equations of the form x^2 = p and x^3 = p, where p is a positive rational number. Evaluate square roots of small perfect squares and cube roots of small perfect cubes. Know that √2 is irrational. [8-EE2] **CONTENT NOW ADDRESSED IN GRADE 6:** **6.14. Apply the properties of operations to generate equivalent expressions.[6-EE3]** **CONTENT NOW ADDRESSED IN GRADE 7:** **7.8. Understand that rewriting an expression in different forms in a problem context can shed light on the problem and how the quantities in it are related. [7-EE2]** **7.7. Apply properties of operations as strategies to add, subtract, factor, and expand linear expressions with rational coefficients. [7-EE1]**
8.4	**Graph linear relations by plotting points or by using the slope and y-intercept.**	8.7. Graph proportional relationships, interpreting the unit rate as the slope of the graph. Compare two different proportional relationships represented in different ways. [8-EE5] 8.8. Use similar triangles to explain why the slope *m* is the same between any two distinct point on a non-vertical line in the coordinate plane; derive the equation $y = mx$ for a line through the origin and the equation $y = mx + b$ for a line intercepting the vertical axis at b. [8-EE6] 8.14. Construct a function to model a linear relationship between two quantities. Determine the rate of change and initial value of the function from a description of a relationship or from two (x, y) values, including reading these from a table or from a graph. Interpret the rate of change and initial value of a linear function in terms of the situation it models, and in terms of its graph or a table of values. [8-F4] 8.15. Describe qualitatively the functional relationship between two quantities by analyzing a graph (e.g., where the function is increasing or decreasing, linear or nonlinear). Sketch a graph that exhibits the qualitative features of a function that has been described verbally. [8-F5]
8.4.B.1	**Determining slopes and y-intercepts of lines**	8.7. Graph proportional relationships, interpreting the unit rate as the slope of the graph. Compare two different proportional relationships represented in different ways. [8-EE5] 8.8. Use similar triangles to explain why the slope *m* is the same between any two distinct point on a non-vertical line in the coordinate plane; derive the equation $y = mx$ for a line through the origin and the equation $y = mx + b$ for a line intercepting the vertical axis at b. [8-EE6]

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8.4.B.2	**Calculating the slope of a linear relation given as a table or graph**	8.8. Use similar triangles to explain why the slope *m* is the same between any two distinct point on a non-vertical line in the coordinate plane; derive the equation $y = mx$ for a line through the origin and the equation $y = mx + b$ for a line intercepting the vertical axis at b. [8-EE6] 8.14. Construct a function to model a linear relationship between two quantities. Determine the rate of change and initial value of the function from a description of a relationship or from two (x, y) values, including reading these from a table or from a graph. Interpret the rate of change and initial value of a linear function in terms of the situation it models, and in terms of its graph or a table of values. [8-F4]
8.4.B.3	**Exhibiting conceptual understanding of various uses of variables**	**CONTENT NOW ADDRESSED IN GRADE 6:** **6.13. Write, read, and evaluate expressions in which letters stand for numbers. [6-EE2]** **6.17. Use variables to represent numbers and write expressions when solving a real-world or mathematical problem; understand that a variable can represent an unknown number, or, depending on the purpose at hand, any number in a specified set. [6-EE6]** **CONTENT NOW ADDRESSED IN GRADE 7:** **7.10. Use variables to represent quantities in a real-world or mathematical problem, and construct simple equations and inequalities to solve problems by reasoning about the quantities. [7-EE4]**
8.5	**Solve problems involving linear functions.**	8.9. Solve linear equations in one variable. [8-EE7] 8.9a. Give examples of linear equations in one variable with one solution, infinitely many solutions, or no solutions. Show which of these possibilities is the case by successively transforming the given equation into simpler forms, until an equivalent equation of the form x = a, a = a, or a = b results (where a and b are different numbers). [8-EE7a] 8.9b. Solve linear equations with rational number coefficients, including equations whose solutions require expanding expressions using the distributive property and collecting like terms. [8-EE7b]
8.5.B.1	**Identifying functions from information in tables, sets of ordered pairs, equations, graphs, and mappings**	8.11. Understand that a function is a rule that assigns to each input exactly one output. The graph of a function is the set of ordered pairs consisting of an input and the corresponding output. (Function notation is not required in Grade 8.) [8-F1] 8.14. Construct a function to model a linear relationship between two quantities. Determine the rate of change and initial value of the function from a description of a relationship or from two (x, y) values, including reading these from a table or from a graph. Interpret the rate of change and initial value of a linear function in terms of the situation it models, and in terms of its graph or a table of values. [8-F4]

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8.5.B.2	**Determining the rule that defines a function**	8.11. Understand that a function is a rule that assigns to each input exactly one output. The graph of a function is the set of ordered pairs consisting of an input and the corresponding output. (Function notation is not required in Grade 8.) [8-F1] 8.13. Interpret the equation y = mx + b as defining a linear function, whose graph is a straight line; give examples of functions that are not linear. [8-F3] 8.14. Construct a function to model a linear relationship between two quantities. Determine the rate of change and initial value of the function from a description of a relationship or from two (x, y) values, including reading these from a table or from a graph. Interpret the rate of change and initial value of a linear function in terms of the situation it models, and in terms of its graph or a table of values. [8-F4] 8.15. Describe qualitatively the functional relationship between two quantities by analyzing a graph (e.g., where the function is increasing or decreasing, linear or nonlinear). Sketch a graph that exhibits the qualitative features of a function that has been described verbally. [8-F5]
8.5.B.3	**Classifying variables in a function as independent or dependent**	**CONTENT NOW ADDRESSED IN GRADE 6:** **6.20. Use variables to represent two quantities in a real-world problem that change in relationship to one another; write an equation to express one quantity, thought of as the dependent variable, in terms of the other quantity, thought of as the independent variable. Analyze the relationship between the dependent and independent variables using graphs and tables, and relate these to the equation. [6-EE9]**
8.5.B.4	**Classifying relations as linear or nonlinear by examining tables, graphs, or simple equations**	8.11. Understand that a function is a rule that assigns to each input exactly one output. The graph of a function is the set of ordered pairs consisting of an input and the corresponding output. (Function notation is not required in Grade 8.) [8-F1] 8.13. Interpret the equation y = mx + b as defining a linear function, whose graph is a straight line; give examples of functions that are not linear. [8-F3]
8.6	**Solve multistep linear equations, including equations requiring the use of the distributive property.**	8.9. Solve linear equations in one variable. [8-EE7] 8.9a. Give examples of linear equations in one variable with one solution, infinitely many solutions, or no solutions. Show which of these possibilities is the case by successively transforming the given equation into simpler forms, until an equivalent equation of the form x = a, a = a, or a = b results (where a and b are different numbers). [8-EE7a] 8.9b. Solve linear equations with rational number coefficients, including equations whose solutions require expanding expressions using the distributive property and collecting like terms. [8-EE7b]
8.7	**Solve problems using the Pythagorean Theorem.**	8.22. Apply the Pythagorean Theorem to determine unknown side lengths in right triangles in real-world and mathematical problems in two and three dimensions. [8-G7] 8.23. Apply the Pythagorean Theorem to find the distance between two points in a coordinate system. [8-G8]
8.7.B.1	**Applying the Triangle Inequality Theorem**	**CONTENT NOW ADDRESSED IN GRADE 7:** **12. Draw (freehand, with ruler and protractor, and with technology) geometric shapes with given conditions. Focus on constructing triangles from three measures of angles or sides, noticing when the conditions determine a unique triangle, more than one triangle, or no triangle. [7-G2]**
8.7.B.2	**Verifying the Pythagorean Theorem**	8.21. Explain a proof of the Pythagorean Theorem and its converse. [8-G6]
8.7.B.3	**Applying the Pythagorean Theorem to determine if a triangle is a right triangle**	**CONTENT NO LONGER ADDRESSED IN GRADE 8**

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8.7.B.4	**Applying the Pythagorean Theorem to find the missing length of a side of a right triangle**	8.22. Apply the Pythagorean Theorem to determine unknown side lengths in right triangles in real-world and mathematical problems in two and three dimensions. [8-G7]
8.7.B.5	**Calculating distances on the coordinate plane using the Pythagorean Theorem**	8.23. Apply the Pythagorean Theorem to find the distance between two points in a coordinate system. [8-G8]
8.8 **8.8.B.1**	**Compare quadrilaterals, triangles, and solids, using their properties and characteristics.** **Developing mathematical arguments about the relationships among types of quadrilaterals and triangles**	8.17. Understand that a two-dimensional figure is congruent to another if the second can be obtained from the first by a sequence of rotations, reflections, and translations; given two congruent figures, describe a sequence that exhibits the congruence between them. [8-G2] 8.18. Describe the effect of dilations, translations, rotations and reflections on two-dimensional figures using coordinates. [8-G3] 8.19. Understand that a two-dimensional figure is similar to another if the second can be obtained from the first by a sequence of rotations, reflections, translations, and dilations; given two similar two-dimensional figures, describe a sequence that exhibits the similarity between them. [8-G4]
8.8.B.2	**Identifying angle bisectors, perpendicular bisectors, congruent angles, and congruent figures**	**CONTENT NO LONGER ADDRESSED IN GRADE 8**
8.8.B.3	**Constructing congruent and similar polygons, congruent angles, congruent segments, and parallel and perpendicular lines**	8.16. Verify experimentally the properties of rotations, reflections, and translations: [8-G1] a. Lines are taken to lines, and line segments to line segments of the same length. [8-G1a] b. Angles are taken to angles of the same measure.[8-G1b] c. Parallel lines are taken to parallel lines. [8-G1c] 8.17. Understand that a two-dimensional figure is congruent to another if the second can be obtained from the first by a sequence of rotations, reflections, and translations; given two congruent figures, describe a sequence that exhibits the congruence between them. [8-G2] 8.19. Understand that a two-dimensional figure is similar to another if the second can be obtained from the first by a sequence of rotations, reflections, translations, and dilations; given two similar two-dimensional figures, describe a sequence that exhibits the similarity between them. [8-G4]
8.9	**Determine the measures of special angle pairs, including adjacent, vertical, supplementary, and complementary angles, and angles formed by parallel lines cut by a transversal.**	8.20. Use informal arguments to establish facts about the angle sum and exterior angle of triangles, about the angles created when parallel lines are cut by a transversal, and the angle-angle criterion for similarity of triangles. [8-G5]
8.10	**Find the perimeter and area of regular and irregular plane figures.**	**CONTENT NOW ADDRESSED IN GRADE 7:** **7.16. Solve real-world and mathematical problems involving area, volume and surface area of two- and three-dimensional objects composed of triangles, quadrilaterals, polygons, cubes, and right prisms. [7-G6]** **CONTENT NOW ADDRESSED IN GRADE 6:** **6.21. Find area of right triangles, other triangles, special quadrilaterals, and polygons by composing into rectangles or decomposing into triangles and other shapes; apply these techniques in the context of solving real-world and mathematical problems. [6-G1]** **CONTENT NOW ADDRESSED IN GRADE 4:** **4.21. Apply the area and perimeter formulas for rectangles in real-world and mathematical problems. [4-MD3]** **CONTENT NOW ADDRESSED IN GRADE 3:** **3.23. Solve real world and mathematical problems involving perimeters of polygons, including finding the perimeter given the side lengths, finding an unknown side length, and exhibiting rectangles with the same perimeter and different areas or with the same area and different perimeters. [3-MD1]**

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8.11 **8.11.B.2** **8.11.B.3**	**Determine the surface area and volume of rectangular prisms, cylinders, and pyramids** **Determining the appropriate units of measure to describe surface area and volume** **Developing formulas for determining surface area and volume of rectangular prisms, cylinders, and pyramids**	8.24. Know the formulas for the volume of cones, cylinders, and spheres and use them to solve real-world and mathematical problems. [8-G9] **CONTENT NOW ADDRESSED IN GRADE 7:** **7.16. Solve real-world and mathematical problems involving area, volume and surface area of two- and three-dimensional objects composed of triangles, quadrilaterals, polygons, cubes, and right prisms. [7-G6]** **CONTENT NOW ADDRESSED IN GRADE 6:** **6.22. Find the volume of a right rectangular prism with fractional edge lengths by packing it with unit cubes of the appropriate unit fraction edge lengths, and show that the volume is the same as would be found by multiplying the edge lengths of the prism. Apply the formulas V = l w h and V = B h to find volumes of right rectangular prisms with fractional edge lengths in the context of solving real-world and mathematical problems. [6-G2]** **CONTENT NOW ADDRESSED IN GRADE 5:** **5. 20. Recognize volume as an attribute of solid figures and understand concepts 20of volume measurement. [5-MD3]** **a. A cube with side length 1 unit, called a "unit cube," is said to have "one cubic unit" of volume, and can be used to measure volume. [5-MD3a** **b. A solid figure which can be packed without gaps or overlaps using *n* unit cubes is said to have a volume of *n* cubic units. [5-MD3b]** **5.21. Measure volumes by counting unit cubes, using cubic cm, cubic in, cubic ft, and improvised units. [5-MD4]** **5.22. Relate volume to the operations of multiplication and addition and solve real world and mathematical problems involving volume. [5-MD5]**
8.11.B.1	**Estimating surface area and volume of solid figures**	**CONTENT NO LONGER ADDRESSED IN GRADE 8**
8.12	**Determine the lengths of missing sides and measures of angles in similar and congruent figures.**	**CONTENT NOW ADDRESSED IN GRADE 7:** **7.11. 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. [7-G1]**
8.12.B.1	**Applying proportional reasoning**	**CONTENT NOW ADDRESSED IN GRADE 7:** **7.11. 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. [7-G1]**
8.12.B.2	**Using dilations on the coordinate plane to determine measures of similar figures**	8.18. Describe the effect of dilations, translations, rotations and reflections on two-dimensional figures using coordinates. [8-G3]
8.12.B.3	**Finding the ratios of the perimeters and areas of similar triangles, trapezoids, and parallelograms**	**CONTENT NO LONGER ADDRESSED IN GRADE 8**
8.13	**Interpret data from populations, using given and collected data.**	8.25. Construct and interpret scatter plots for bivariate measurement data to investigate patterns of association between two quantities. Describe patterns such as clustering, outliers, positive or negative association, linear association, and nonlinear association. [8-SP1]
8.13.B.1	**Representing the data with the most appropriate graph, including box-and-whisker plot, circle graph, and scatterplot**	8.25. Construct and interpret scatter plots for bivariate measurement data to investigate patterns of association between two quantities. Describe patterns such as clustering, outliers, positive or negative association, linear association, and nonlinear association. [8-SP1]

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8.13.B.2	**Making predictions by estimating the line of best fit from a scatterplot**	8.25. Construct and interpret scatter plots for bivariate measurement data to investigate patterns of association between two quantities. Describe patterns such as clustering, outliers, positive or negative association, linear association, and nonlinear association. [8-SP1] 8.26. Know that straight lines are widely used to model relationships between two quantitative variables. For scatter plots that suggest a linear association, informally fit a straight line, and informally assess the model fit by judging the closeness of the data points to the line. [8-SP2] 8.27. Use the equation of a linear model to solve problems in the context of bivariate measurement data, interpreting the slope and intercept. [8-SP3]
8.13.B.3	**Comparing data sets involving two populations**	8.28. Understand that patterns of association can also be seen in bivariate categorical data by displaying frequencies and relative frequencies in a two-way table. Construct and interpret a two-way table summarizing data on two categorical variables collected from the same subjects. Use relative frequencies calculated for rows or columns to describe possible association between the two variables. [8-SP4]
8.13.B.4	**Determining the measure of center that is the most appropriate for a given situation**	**CONTENT NO LONGER ADDRESSED IN GRADE 8**
8.14	**Determine the theoretical probability of an event.**	**CONTENT NO LONGER ADDRESSED IN GRADE 8**
8.14.B.1	**Calculating the probability of complementary events and mutually exclusive events**	**CONTENT NO LONGER ADDRESSED IN GRADE 8**
8.14.B.2	**Comparing experimental and theoretical probability**	**CONTENT NO LONGER ADDRESSED IN GRADE 8**
8.14.B.3	**Computing the probability of two independent events and two dependent events**	**CONTENT NO LONGER ADDRESSED IN GRADE 8**
8.14.B.4	**Determining the probability of an event through simulation**	**CONTENT NO LONGER ADDRESSED IN GRADE 8**
CONTENT MOVED TO GRADE 8 IN 2010 ACOS		
AI.2	**Analyze linear functions from their equations, slopes, and intercepts.**	8.12. Compare properties of two functions each represented in a different way (algebraically, graphically, numerically in tables, or by verbal descriptions). [8-F2]
AI.8	**Solve systems of linear equations and inequalities in two variables graphically or algebraically.**	8.10. Analyze and solve pairs of simultaneous linear equations. [8-EE8] 8.10a. Understand that solutions to a system of two linear equations in two variables correspond to points of intersection of their graphs, because points of intersection satisfy both equations simultaneously. [8-EE8a] 8.10b. Solve systems of two linear equations in two variables algebraically, and estimate solutions by graphing the equations. Solve simple cases by inspection. [8-EE8b] 8.10c. Solve real-world and mathematical problems leading to two linear equations in two variables. [8-EE8c]
	NEW GRADE 8 CONTENT IN 2010 ACOS	