

Virtual Learning Academy
Jefferson County Educational Service Center
Academic Content Standards
Differentiated Algebra I / Pre-Algebra

Differentiated Algebra I / Pre-Algebra Lesson 01 - Expressions, Variables, and Properties

Math 9 Differentiated Algebra I / PreAlgebra Lesson 01 - Expressions, Variables, and Properties

Standard Benchmark and Indicator
S01. Number, Number Sense and Operations
C. Apply properties of operations and the real number system, and justify when they hold for a set of numbers. (08-10)
01. Identify and justify whether properties (closure, identity, inverse, commutative and associative) hold for a given set and operations; e.g., even integers and multiplication. (09)
G. Estimate, compute and solve problems involving real numbers, including ratio, proportion and percent, and explain solutions. (08-10)
04. Demonstrate fluency in computations using real numbers. (09)

Differentiated Algebra I / Pre-Algebra Lesson 02 - Expressions, Equations, and Inequalities

Math 9 Differentiated Algebra I / PreAlgebra Lesson 02 - Expressions, Equations, and Inequalities

Standard Benchmark and Indicator
S04. Patterns, Functions and Algebra
D. Use algebraic representations, such as tables, graphs, expressions, functions and inequalities, to model and solve problem situations. (08-10)
11. Add, subtract, multiply and divide monomials and polynomials (division of polynomials by monomials only). (09)
F. Solve and graph linear equations and inequalities. (08-10)
06. Write and use equivalent forms of equations and inequalities in problem situations; e.g., changing a linear equation to the slope-intercept form. (09)
09. Solve linear equations and inequalities graphically, symbolically and using technology. (08)

Differentiated Algebra I / Pre-Algebra Lesson 03 - Integers and Equations

Math 9 Differentiated Algebra I / PreAlgebra Lesson 03 - Integers and Equations

Standard Benchmark and Indicator
S01. Number, Number Sense and Operations
E. Compare, order and determine equivalent forms of real numbers. (08-10)
02. Compare, order and determine equivalent forms for rational and irrational numbers. (09)
G. Estimate, compute and solve problems involving real numbers, including ratio, proportion and percent, and explain solutions. (08-10)
04. Demonstrate fluency in computations using real numbers. (09)

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Differentiated Algebra I / Pre-Algebra Lesson 04 - Rational Numbers, Exponents, and Monomials

Math 9 Differentiated Algebra I / PreAlgebra Lesson 04 - Rational Numbers, Exponents, and Monomials

Standard Benchmark and Indicator
S04. Patterns, Functions and Algebra
D. Use algebraic representations, such as tables, graphs, expressions, functions and inequalities, to model and solve problem situations. (08-10)
11. Add, subtract, multiply and divide monomials and polynomials (division of polynomials by monomials only). (09)
12. Simplify rational expressions by eliminating common factors and applying properties of integer exponents. (09)

Differentiated Algebra I / Pre-Algebra Lesson 05 – Polynomials

Math 9 Differentiated Algebra I / PreAlgebra Lesson 05 - Polynomials

Standard Benchmark and Indicator
S04. Patterns, Functions and Algebra
D. Use algebraic representations, such as tables, graphs, expressions, functions and inequalities, to model and solve problem situations. (08-10)
11. Add, subtract, multiply and divide monomials and polynomials (division of polynomials by monomials only). (09)

Differentiated Algebra I / Pre-Algebra Lesson 06 - Review of Lessons #1 through #4

Differentiated Algebra I / Pre-Algebra Lesson 07 - Relations and Functions

Math 9 Differentiated Algebra I / PreAlgebra Lesson 07 - Relations and Functions

Standard Benchmark and Indicator
S04. Patterns, Functions and Algebra
B. Identify and classify functions as linear or nonlinear, and contrast their properties using tables, graphs or equations. (08-10)
01. Define function with ordered pairs in which each domain element is assigned exactly one range element. (09)
03. Describe problem situations (linear, quadratic and exponential) by using tabular, graphical and symbolic representations. (09)

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Differentiated Algebra I / Pre-Algebra Lesson 08 - Functions, Slope, Intercepts

Math 9 Differentiated Algebra I / PreAlgebra Lesson 08 - Functions, Slope, Intercepts

Standard Benchmark and Indicator
S03. Geometry and Spatial Sense
G. Prove or disprove conjectures and solve problems involving two- and three-dimensional objects represented within a coordinate system. (08-10)
03. Analyze two-dimensional figures in a coordinate plane; e.g., use slope and distance formulas to show that a quadrilateral is a parallelogram. (09)
S04. Patterns, Functions and Algebra
E. Analyze and compare functions and their graphs using attributes, such as rates of change, intercepts and zeros. (08-10)
05. Describe and compare characteristics of the following families of functions: linear, quadratic and exponential functions; e.g., general shape, number of roots, domain, range, rate of change, maximum or minimum. (09)
F. Solve and graph linear equations and inequalities. (08-10)
06. Write and use equivalent forms of equations and inequalities in problem situations; e.g., changing a linear equation to the slope-intercept form. (09)

Differentiated Algebra I / Pre-Algebra Lesson 09 - Mid-Semester Test

Differentiated Algebra I / Pre-Algebra Lesson 10 - Systems of Equations

Math 9 Differentiated Algebra I / PreAlgebra Lesson 10 - Systems of Equations

Standard Benchmark and Indicator
S04. Patterns, Functions and Algebra
H. Solve systems of linear equations involving two variables graphically and symbolically. (08-10)
09. Solve and interpret the meaning of 2 by 2 systems of linear equations graphically, by substitution and by elimination, with and without technology. (09)
10. Solve 2 by 2 systems of linear equations graphically and by simple substitution. (08)
11. Interpret the meaning of the solution of a 2 by 2 system of equations; i.e., point, line, no solution. (08)

Differentiated Algebra I / Pre-Algebra Lesson 11 - Ratios and Proportions

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Standard Benchmark and Indicator
S01. Number, Number Sense and Operations

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G. Estimate, compute and solve problems involving real numbers, including ratio, proportion and percent, and explain solutions. (08-10)
06. Estimate, compute and solve problems involving rational numbers, including ratio, proportion and percent, and judge the reasonableness of solutions. (08)
S02. Measurement
D. Use proportional reasoning and apply indirect measurement techniques, including right triangle trigonometry and properties of similar triangles, to solve problems involving measurements and rates. (08-10)
05. Solve problems involving unit conversion for situations involving distances, areas, volumes and rates within the same measurement system. (09)

Differentiated Algebra I / Pre-Algebra Lesson 12 - Basics of Percent Problems

Math 9 Differentiated Algebra I / PreAlgebra Lesson 12 - Basics of Percent Problems

Standard Benchmark and Indicator
S01. Number, Number Sense and Operations
G. Estimate, compute and solve problems involving real numbers, including ratio, proportion and percent, and explain solutions. (08-10)
04. Demonstrate fluency in computations using real numbers. (09)
06. Estimate, compute and solve problems involving rational numbers, including ratio, proportion and percent, and judge the reasonableness of solutions. (08)

Differentiated Algebra I / Pre-Algebra Lesson 13 - Applications of Percent

Math 9 Differentiated Algebra I / PreAlgebra Lesson 13 - Applications of Percent

Standard Benchmark and Indicator
S01. Number, Number Sense and Operations
G. Estimate, compute and solve problems involving real numbers, including ratio, proportion and percent, and explain solutions. (08-10)
04. Demonstrate fluency in computations using real numbers. (09)
06. Estimate, compute and solve problems involving rational numbers, including ratio, proportion and percent, and judge the reasonableness of solutions. (08)
S04. Patterns, Functions and Algebra
F. Solve and graph linear equations and inequalities. (08-10)
06. Write and use equivalent forms of equations and inequalities in problem situations; e.g., changing a linear equation to the slope-intercept form. (09)

Differentiated Algebra I / Pre-Algebra Lesson 14 - Process Data

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of data. (08-10)

04. Compare two sets of data using measures of center (mean, mode, median) and measures of spread (range, quartiles, interquartile range, percentiles). (08)

Differentiated Algebra I / Pre-Algebra Lesson 15 - Display and Interpret Data

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S05. Data Analysis and Probability

C. Compare the characteristics of the mean, median and mode for a given set of data, and explain which measure of center best represents the data. (08-10)

05. Explain the mean's sensitivity to extremes and its use in comparison with the median and mode. (08)

E. Evaluate the validity of claims and predictions that are based on data by examining the appropriateness of the data collection and analysis. (08-10)

04. Describe and compare various types of studies (survey, observation, experiment), and identify possible misuses of statistical data. (09)

F. Construct convincing arguments based on analysis of data and interpretation of graphs. (08-10)

09. Construct convincing arguments based on analysis of data and interpretation of graphs. (08)

Differentiated Algebra I / Pre-Algebra Lesson 16 - Evaluating Data in Tables and Graphs

Math 9 Differentiated Algebra I / PreAlgebra Lesson 16 - Evaluating Data in Tables and Graphs

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B. Evaluate different graphical representations of the same data to determine which is the most appropriate representation for an identified purpose. (08-10)
02. Evaluate different graphical representations of the same data to determine which is the most appropriate representation for an identified purpose; e.g., line graph for change over time, circle graph for part-to-whole comparison, scatterplot for relationship between two variants. (08)
E. Evaluate the validity of claims and predictions that are based on data by examining the appropriateness of the data collection and analysis. (08-10)
04. Describe and compare various types of studies (survey, observation, experiment), and identify possible misuses of statistical data. (09)
F. Construct convincing arguments based on analysis of data and interpretation of graphs. (08-10)
06. Make conjectures about possible relationship in a scatterplot and approximate line of best fit. (08)
09. Construct convincing arguments based on analysis of data and interpretation of graphs. (08)
G. Describe sampling methods and analyze the effects of method chosen on how well the resulting sample represents the population. (08-10)
05. Describe characteristics and limitations of sampling methods, and analyze the effects of random versus biased sampling; e.g., determine and justify whether the sample is likely to be representative of the population. (09)

Differentiated Algebra I / Pre-Algebra Lesson 17 - Review of First Semester

Differentiated Algebra I / Pre-Algebra Lesson 18 - First Semester Exam

Differentiated Algebra I / Pre-Algebra Lesson 19 - Systems of Equations

Math 9 Differentiated Algebra I / PreAlgebra Lesson 19 - Systems of Equations

Standard Benchmark and Indicator
S04. Patterns, Functions and Algebra
H. Solve systems of linear equations involving two variables graphically and symbolically. (08-10)
09. Solve and interpret the meaning of 2 by 2 systems of linear equations graphically, by substitution and by elimination, with and without technology. (09)

Differentiated Algebra I / Pre-Algebra Lesson 20 - Permutations and Combinations

Math 9 Differentiated Algebra I / PreAlgebra Lesson 20 - Permutations and Combinations

Standard Benchmark and Indicator
S05. Data Analysis and Probability
H. Use counting techniques, such as permutations and combinations, to determine the total number of options and possible outcomes. (08-10)
07. Use counting techniques and the Fundamental Counting principle to determine the total number of possible outcomes for mathematical situations. (09)
10. Calculate the number of possible outcomes for a situation, recognizing and accounting for when items may occur more than once or when order is important.

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10. Calculate the number of possible outcomes for a situation, recognizing and accounting for when items may occur more than once or when order is important. (08)
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Differentiated Algebra I / Pre-Algebra Lesson 21 - Probability

Math 9 Differentiated Algebra I / PreAlgebra Lesson 21 - Probability

Standard Benchmark and Indicator
S05. Data Analysis and Probability
H. Use counting techniques, such as permutations and combinations, to determine the total number of options and possible outcomes. (08-10)
10. Calculate the number of possible outcomes for a situation, recognizing and accounting for when items may occur more than once or when order is important. (08)
I. Design an experiment to test a theoretical probability, and record and explain results. (08-10)
08. Describe, create and analyze a sample space and use it to calculate probability. (09)
J. Compute probabilities of compound events, independent events, and simple dependent events. (08-10)
09. Identify situations involving independent and dependent events, and explain differences between, and common misconceptions about probabilities associated with those events. (09)
11. Demonstrate an understanding that the probability of either of two disjoint events occurring can be found by adding the probabilities for each and that the probability of one independent event following another can be found by multiplying the probabilities. (08)
K. Make predictions based on theoretical probabilities and experimental results. (08-10)
10. Use theoretical and experimental probability, including simulations or random numbers, to estimate probabilities and to solve problems dealing with uncertainty; e.g., compound events, independent events, simple dependent events. (09)

Differentiated Algebra I / Pre-Algebra Lesson 22 - Measurement Conversions

Math 9 Differentiated Algebra I / PreAlgebra Lesson 22 - Measurement Conversions

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calculated results. (08)
03. Use appropriate levels of precision when calculating with measurements. (08)
D. Use proportional reasoning and apply indirect measurement techniques, including right triangle trigonometry and properties of similar triangles, to solve problems involving measurements and rates. (08-10)
01. Compare and order the relative size of common U.S. customary units and metric units; e.g., mile and kilometer, gallon and liter, pound and kilogram. (08)
01. Convert rates within the same measurement system; e.g., miles per hour to feet per second; kilometers per hour to meters per second. (09)
02. Use proportional relationships and formulas to convert units from one measurement system to another; e.g., degrees Fahrenheit to degrees Celsius. (08)
02. Use unit analysis to check computations involving measurement. (09)
05. Solve problems involving unit conversion for situations involving distances, areas, volumes and rates within the same measurement system. (09)
07. Apply proportional reasoning to solve problems involving indirect measurements or rates. (08)
E. Estimate and compute various attributes, including length, angle measure, area, surface area and volume, to a specified level of precision. (08-10)
03. Use appropriate levels of precision when calculating with measurements. (08)
F. Write and solve real-world, multi-step problems involving money, elapsed time and temperature, and verify reasonableness of solutions. (08-10)
06. Solve and determine the reasonableness of the results for problems involving rates and derived measurements, such as velocity and density, using formulas, models and graphs. (08)

Differentiated Algebra I / Pre-Algebra Lesson 23 - Points, Lines, Angles, and Circles

Math 9 Differentiated Algebra I / PreAlgebra Lesson 23 - Points, Lines, Angles, and Circles

Standard Benchmark and Indicator
S03. Geometry and Spatial Sense
C. Recognize and apply angle relationships in situations involving intersecting lines, perpendicular lines and parallel lines. (08-10)
02. Recognize the angles formed and the relationship between the angles when two lines intersect and when parallel lines are cut by a transversal. (08)

Differentiated Algebra I / Pre-Algebra Lesson 24 - Properties of Triangles

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B. Describe and apply the properties of similar and congruent figures; and justify conjectures involving similarity and congruence. (08-10)
01. Make and test conjectures about characteristics and properties (e.g., sides, angles, symmetry) of two-dimensional figures and three-dimensional objects. (08)
03. Use proportions in several forms to solve problems involving similar figures (part-to-part, part-to-whole, corresponding sides between figures). (08)
D. Use coordinate geometry to represent and examine the properties of geometric figures. (08-10)
01. Make and test conjectures about characteristics and properties (e.g., sides, angles, symmetry) of two-dimensional figures and three-dimensional objects. (08)
H. Establish the validity of conjectures about geometric objects, their properties and relationships by counter-example, inductive and deductive reasoning, and critiquing arguments made by others. (08-10)
01. Make and test conjectures about characteristics and properties (e.g., sides, angles, symmetry) of two-dimensional figures and three-dimensional objects. (08)

Differentiated Algebra I / Pre-Algebra Lesson 25 - Polygons and Quadrilaterals; Sequences

Math 9 Differentiated Algebra I / PreAlgebra Lesson 25 - Polygons and Quadrilaterals;
Sequences

Standard Benchmark and Indicator
S02. Measurement
E. Estimate and compute various attributes, including length, angle measure, area, surface area and volume, to a specified level of precision. (08-10)
08. Find the sum of the interior and exterior angles of regular convex polygons with and without measuring the angles with a protractor. (08)

Differentiated Algebra I / Pre-Algebra Lesson 26 - Transformations

Math 9 Differentiated Algebra I / PreAlgebra Lesson 26 - Transformations

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geometric figures. (08-10)
04. Represent and analyze shapes using coordinate geometry; e.g., given three vertices and the type of quadrilateral, find the coordinates of the fourth vertex. (08)
F. Represent and model transformations in a coordinate plane and describe the results. (08-10)
05. Draw the results of translations, reflections, rotations and dilations of objects in the coordinate plane; describe the transformations and their effects on the objects.

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05. Draw the results of translations, reflections, rotations and dilations of objects in the coordinate plane, and determine properties that remain fixed; e.g., lengths of sides remain the same under translations. (08)
G. Prove or disprove conjectures and solve problems involving two- and three-dimensional objects represented within a coordinate system. (08-10)
03. Analyze two-dimensional figures in a coordinate plane; e.g., use slope and distance formulas to show that a quadrilateral is a parallelogram. (09)

Differentiated Algebra I / Pre-Algebra Lesson 27 - Review of Lessons 19 Through 26

Differentiated Algebra I / Pre-Algebra Lesson 28 - Perimeter, Circumference, Area

Math 9 Differentiated Algebra I / PreAlgebra Lesson 28 - Perimeter, Circumference, Area

Standard Benchmark and Indicator
S02. Measurement
C. Apply indirect measurement techniques, tools and formulas, as appropriate, to find perimeter, circumference and area of circles, triangles, quadrilaterals and composite shapes, and to find volume of prisms, cylinders, and pyramids. (08-10)
09. Demonstrate understanding of the concepts of perimeter, circumference and area by using established formulas for triangles, quadrilaterals, and circles to determine the surface area and volume of prisms, pyramids, cylinders, spheres and cones. (Note: Only volume should be calculated for spheres and cones.) (08)

Differentiated Algebra I / Pre-Algebra Lesson 29 - Surface Area

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Standard Benchmark and Indicator

04. Derive formulas for surface area and volume and justify them using geometric models and common materials. For example, find: (08)
04. the surface area of a cylinder as a function of its height and radius; (08)
04. that the volume of a pyramid (or cone) is one-third of the volume of a prism (or cylinder) with the same base area and height. (08)
C. Apply indirect measurement techniques, tools and formulas, as appropriate, to find perimeter, circumference and area of circles, triangles, quadrilaterals and composite shapes, and to find volume of prisms, cylinders, and pyramids. (08-10)
05. Determine surface area for pyramids by analyzing their parts. (08)
09. Demonstrate understanding of the concepts of perimeter, circumference and area by using established formulas for triangles, quadrilaterals, and circles to determine the surface area and volume of prisms, pyramids, cylinders, spheres

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10. Use conventional formulas to find the surface area and volume of prisms, pyramids and cylinders and the volume of spheres and cones to a specified level of precision. (08)
S03. Geometry and Spatial Sense
E. Draw and construct representations of two- and three-dimensional geometric objects using a variety of tools, such as straightedge, compass and technology. (08-10)
06. Draw nets for a variety of prisms, pyramids, cylinders and cones. (08)

Differentiated Algebra I / Pre-Algebra Lesson 30 - Volume

Math 9 Differentiated Algebra I / PreAlgebra Lesson 30 - Volume

Standard Benchmark and Indicator
S02. Measurement
B. Use formulas to find surface area and volume for specified three-dimensional objects accurate to a specified level of precision. (08-10)
04. Derive formulas for surface area and volume and justify them using geometric models and common materials. For example, find: (08)
04. the surface area of a cylinder as a function of its height and radius; (08)
04. that the volume of a pyramid (or cone) is one-third of the volume of a prism (or cylinder) with the same base area and height. (08)
C. Apply indirect measurement techniques, tools and formulas, as appropriate, to find perimeter, circumference and area of circles, triangles, quadrilaterals and composite shapes, and to find volume of prisms, cylinders, and pyramids. (08-10)
09. Demonstrate understanding of the concepts of perimeter, circumference and area by using established formulas for triangles, quadrilaterals, and circles to determine the surface area and volume of prisms, pyramids, cylinders, spheres and cones. (Note: Only volume should be calculated for spheres and cones.) (08)
D. Use proportional reasoning and apply indirect measurement techniques, including right triangle trigonometry and properties of similar triangles, to solve problems involving measurements and rates. (08-10)
03. Use the ratio of lengths in similar two-dimensional figures or three-dimensional objects to calculate the ratio of their areas or volumes respectively. (09)
E. Estimate and compute various attributes, including length, angle measure, area, surface area and volume, to a specified level of precision. (08-10)
10. Use conventional formulas to find the surface area and volume of prisms, pyramids and cylinders and the volume of spheres and cones to a specified level of precision. (08)

Differentiated Algebra I / Pre-Algebra Lesson 31 - Real Number System

Math 9 Differentiated Algebra I / PreAlgebra Lesson 31 - Real Number System

Standard Benchmark and Indicator

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S01. Number, Number Sense and Operations
A. Use scientific notation to express large numbers and numbers less than one. (08-10)
01. Use scientific notation to express large numbers and small numbers between 0 and 1. (08)
B. Identify subsets of the real number system. (08-10)
02. Recognize that natural numbers, whole numbers, integers, rational numbers and irrational numbers are subsets of the real number system. (08)
E. Compare, order and determine equivalent forms of real numbers. (08-10)
02. Compare, order and determine equivalent forms for rational and irrational numbers. (09)
G. Estimate, compute and solve problems involving real numbers, including ratio, proportion and percent, and explain solutions. (08-10)
05. Determine when an estimate is sufficient and when an exact answer is needed in problem situations, and evaluate estimates in relation to actual answers; e.g., very close, less than, greater than. (08)
H. Find the square root of perfect squares, and approximate the square root of non-perfect squares. (08-10)
07. Find the square root of perfect squares, and approximate the square root of non-perfect squares as consecutive integers between which the root lies; e.g., (08)
I. Estimate, compute and solve problems involving scientific notation, square roots and numbers with integer exponents. (08-10)
03. Apply order of operations to simplify expressions and perform computations involving integer exponents and radicals. (08)

Differentiated Algebra I / Pre-Algebra Lesson 32 - Quadratic Functions

Math 9 Differentiated Algebra I / PreAlgebra Lesson 32 - Quadratic Functions

Standard Benchmark and Indicator
S04. Patterns, Functions and Algebra
G. Solve quadratic equations with real roots by graphing, formula and factoring. (08-10)
10. Solve quadratic equations with real roots by factoring, graphing, using the quadratic formula and with technology. (09)

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Differentiated Algebra I / Pre-Algebra Lesson 33 - Pythagorean Theorem and Right Triangles

Math 9 Differentiated Algebra I / PreAlgebra Lesson 33 - Pythagorean Theorem and Right Triangles

Standard Benchmark and Indicator
S01. Number, Number Sense and Operations
H. Find the square root of perfect squares, and approximate the square root of non-perfect squares. (08-10)
07. Find the square root of perfect squares, and approximate the square root of non-perfect squares as consecutive integers between which the root lies; e.g., (08)
I. Estimate, compute and solve problems involving scientific notation, square roots and numbers with integer exponents. (08-10)
05. Estimate the solutions for problem situations involving square and cube roots. (09)

Differentiated Algebra I / Pre-Algebra Lesson 34 - Scale Drawings, Similar Figures, Right Triangle Trigonometry

Math 9 Differentiated Algebra I / PreAlgebra Lesson 34 - Scale Drawings, Similar Figures, Right Triangle Trigonometry

Standard Benchmark and Indicator
S02. Measurement
D. Use proportional reasoning and apply indirect measurement techniques, including right triangle trigonometry and properties of similar triangles, to solve problems involving measurements and rates. (08-10)
03. Use the ratio of lengths in similar two-dimensional figures or three-dimensional objects to calculate the ratio of their areas or volumes respectively. (09)
04. Use scale drawings and right triangle trigonometry to solve problems that include unknown distances and angle measures. (09)
S03. Geometry and Spatial Sense
I. Use right triangle trigonometric relationships to determine lengths and angle measures. (08-10)
01. Define the basic trigonometric ratios in right triangles: sine, cosine and tangent. (09)
02. Apply proportions and right triangle trigonometric ratios to solve problems involving missing lengths and angle measures in similar figures. (09)

Differentiated Algebra I / Pre-Algebra Lesson 35 - Review of Lessons 19 Through 34

Differentiated Algebra I / Pre-Algebra Lesson 36 - Final Exam

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