

Virtual Learning Academy
Jefferson County Educational Service Center
Academic Content Standards
Geometry - Differentiated

Geometry Differentiated Lesson 01 - Points, Lines, Planes

Math 10 Geometry Differentiated Lesson 01 - Points, Lines, Planes

Standard Benchmark and Indicator
S03. Geometry and Spatial Sense
A. Formally define geometric figures. (08-10)
01. Formally define and explain key aspects of geometric figures, including: (10)

Geometry Differentiated Lesson 02 – Angles

Math 10 Geometry Differentiated Lesson 02 - Angles

Standard Benchmark and Indicator
S03. Geometry and Spatial Sense
A. Formally define geometric figures. (08-10)
01. Formally define and explain key aspects of geometric figures, including: (10)
01. circles (radius, diameter, chord, circumference, major arc, minor arc, sector, segment, inscribed angle). (10)
01. interior and exterior angles of polygons; (10)
01. segments related to triangles (median, altitude, midsegment); (10)
01. points of concurrency related to triangles (centroid, incenter, orthocenter, and circumcenter); (10)
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)
05. Construct congruent or similar figures using tools, such as compass, straightedge, and protractor or dynamic geometry software. (10)
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)
06. Solve equations and inequalities having rational expressions as coefficients and solutions. (10)

Geometry Differentiated Lesson 03 - The Coordinate Plane and Line Segments

Math 10 Geometry Differentiated Lesson 03 - The Coordinate Plane and Line Segments

Standard Benchmark and Indicator
S03. Geometry and Spatial Sense
F. Represent and model transformations in a coordinate plane and describe the results. (08-10)
08. Derive coordinate rules for translations, reflections and rotations of geometric figures in the coordinate plane. (10)
09. Show and describe the results of combinations of translations, reflections and rotations (compositions); e.g., perform compositions and specify the result of a composition as the outcome of a single motion, when applicable. (10)
S04. Patterns, Functions and Algebra
D. Use algebraic representations, such as tables, graphs, expressions, functions

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and inequalities, to model and solve problem situations. (08-10)
06. Solve equations and inequalities having rational expressions as coefficients and solutions. (10)

Geometry Differentiated Lesson 04 - Coordinate Geometry

Math 10 Geometry Differentiated Lesson 04 - Coordinate Geometry

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
D. Use algebraic representations, such as tables, graphs, expressions, functions and inequalities, to model and solve problem situations. (08-10)
03. Solve equations and formulas for a specified variable; e.g., express the base of a triangle in terms of the area and height. (10)
04. Use algebraic representations and functions to describe and generalize geometric properties and relationships. (10)
05. Solve simple linear and nonlinear equations and inequalities having square roots as coefficients and solutions. (10)
06. Solve equations and inequalities having rational expressions as coefficients and solutions. (10)

Geometry Differentiated Lesson 05 – Logic

Math 10 Geometry Differentiated Lesson 05 - Logic

Standard Benchmark and Indicator
S03. Geometry and Spatial Sense
A. Formally define geometric figures. (08-10)
02. Recognize and explain the necessity for certain terms to remain undefined, such as point, line and plane. (10)
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)
03. Make, test and establish the validity of conjectures about geometric properties and relationships using counterexample, inductive and deductive reasoning, and paragraph or two-column proof, including: (10)
03. test a conjecture using basic constructions made with a compass and straightedge or technology. (10)
03. prove the Pythagorean Theorem; (10)
03. prove theorems involving triangle similarity and congruence; (10)
03. prove theorems involving properties of lines, angles, triangles and quadrilaterals; (10)

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Geometry Differentiated Lesson 06 - Introduction to Proofs; Perimeter, Area, and Circumference

Math 10 Geometry Differentiated Lesson 06 - Introduction to Proofs; Perimeter, Area, and Circumference

Standard Benchmark and Indicator
S03. Geometry and Spatial Sense
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)
03. Make, test and establish the validity of conjectures about geometric properties and relationships using counterexample, inductive and deductive reasoning, and paragraph or two-column proof, including: (10)
03. test a conjecture using basic constructions made with a compass and straightedge or technology. (10)
03. prove the Pythagorean Theorem; (10)
03. prove theorems involving triangle similarity and congruence; (10)
03. prove theorems involving properties of lines, angles, triangles and quadrilaterals; (10)
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)
04. Use algebraic representations and functions to describe and generalize geometric properties and relationships. (10)

Geometry Differentiated Lesson 07 – Proofs

Math 10 Geometry Differentiated Lesson 07 - Proofs

Standard Benchmark and Indicator
S03. Geometry and Spatial Sense
A. Formally define geometric figures. (08-10)
01. Formally define and explain key aspects of geometric figures, including: (10)
01. circles (radius, diameter, chord, circumference, major arc, minor arc, sector, segment, inscribed angle). (10)
01. interior and exterior angles of polygons; (10)
01. segments related to triangles (median, altitude, midsegment); (10)
01. points of concurrency related to triangles (centroid, incenter, orthocenter, and circumcenter); (10)

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02. Recognize and explain the necessity for certain terms to remain undefined, such as point, line and plane. (10)
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)
03. Make, test and establish the validity of conjectures about geometric properties and relationships using counterexample, inductive and deductive reasoning, and paragraph or two-column proof, including: (10)
03. test a conjecture using basic constructions made with a compass and straightedge or technology. (10)
03. prove the Pythagorean Theorem; (10)
03. prove theorems involving triangle similarity and congruence; (10)
03. prove theorems involving properties of lines, angles, triangles and quadrilaterals; (10)

Geometry Differentiated Lesson 08 - Formulas, Venn Diagrams

Math 10 Geometry Differentiated Lesson 08 - Formulas, Venn Diagrams

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)
03. Solve equations and formulas for a specified variable; e.g., express the base of a triangle in terms of the area and height. (10)
04. Use algebraic representations and functions to describe and generalize geometric properties and relationships. (10)

Geometry Differentiated Lesson 09 - Review of Lessons #1 through #8

Geometry Differentiated Lesson 10 - Angles, Lines, Transversals, and Parallel Lines

Math 10 Geometry Differentiated Lesson 10 - Angles, Lines, Transversals, and Parallel Lines

Standard Benchmark and Indicator

03. prove theorems involving triangle similarity and congruence; (10)
03. prove theorems involving properties of lines, angles, triangles and

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quadrilaterals; (10)
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)
04. Use algebraic representations and functions to describe and generalize geometric properties and relationships. (10)

Geometry Differentiated Lesson 11 - Relationships of Parallel and Perpendicular Lines

Math 10 Geometry Differentiated Lesson 11 - Relationships of Parallel and Perpendicular Lines

Standard Benchmark and Indicator
S03. Geometry and Spatial Sense
A. Formally define geometric figures. (08-10)
01. Formally define and explain key aspects of geometric figures, including: (10)
01. circles (radius, diameter, chord, circumference, major arc, minor arc, sector, segment, inscribed angle). (10)
01. interior and exterior angles of polygons; (10)
01. segments related to triangles (median, altitude, midsegment); (10)
01. points of concurrency related to triangles (centroid, incenter, orthocenter, and circumcenter); (10)
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)
03. Make, test and establish the validity of conjectures about geometric properties and relationships using counterexample, inductive and deductive reasoning, and paragraph or two-column proof, including: (10)
03. test a conjecture using basic constructions made with a compass and straightedge or technology. (10)
03. prove the Pythagorean Theorem; (10)
03. prove theorems involving triangle similarity and congruence; (10)
03. prove theorems involving properties of lines, angles, triangles and quadrilaterals; (10)
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)
04. Use algebraic representations and functions to describe and generalize geometric properties and relationships. (10)
J. Describe and interpret rates of change from graphical and numerical data. (08-10)
09. Recognize and explain that the slopes of parallel lines are equal and the slopes of perpendicular lines are negative reciprocals. (10)

Geometry Differentiated Lesson 12 - Properties of Triangles

Math 10 Geometry Differentiated Lesson 12 - Properties of Triangles

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S03. Geometry and Spatial Sense
A. Formally define geometric figures. (08-10)
01. Formally define and explain key aspects of geometric figures, including: (10)
01. circles (radius, diameter, chord, circumference, major arc, minor arc, sector, segment, inscribed angle). (10)
01. interior and exterior angles of polygons; (10)
01. segments related to triangles (median, altitude, midsegment); (10)
01. points of concurrency related to triangles (centroid, incenter, orthocenter, and circumcenter); (10)
06. Identify the reflection and rotation symmetries of two- and three-dimensional figures. (10)
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)
04. Construct right triangles, equilateral triangles, parallelograms, trapezoids, rectangles, rhombuses, squares and kites, using compass and straightedge or dynamic geometry software. (10)
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)
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)
03. Make, test and establish the validity of conjectures about geometric properties and relationships using counterexample, inductive and deductive reasoning, and paragraph or two-column proof, including: (10)
03. test a conjecture using basic constructions made with a compass and straightedge or technology. (10)
03. prove the Pythagorean Theorem; (10)
03. prove theorems involving triangle similarity and congruence; (10)
03. prove theorems involving properties of lines, angles, triangles and quadrilaterals; (10)

Geometry Differentiated Lesson 13 - Proving Congruent Triangles

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properties and relationships using counterexample, inductive and deductive reasoning, and paragraph or two-column proof, including: (10)
03. test a conjecture using basic constructions made with a compass and straightedge or technology. (10)
03. prove the Pythagorean Theorem; (10)
03. prove theorems involving triangle similarity and congruence; (10)
03. prove theorems involving properties of lines, angles, triangles and quadrilaterals; (10)
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)
04. Use algebraic representations and functions to describe and generalize geometric properties and relationships. (10)

Geometry Lesson 14 - Quadrilaterals, Parallelograms, Rectangles

Math 10 Geometry Differentiated Lesson 14 - Specialties with Triangles and Indirect Proofs

Standard Benchmark and Indicator
S03. Geometry and Spatial Sense
A. Formally define geometric figures. (08-10)
01. Formally define and explain key aspects of geometric figures, including: (10)
01. circles (radius, diameter, chord, circumference, major arc, minor arc, sector, segment, inscribed angle). (10)
01. interior and exterior angles of polygons; (10)
01. segments related to triangles (median, altitude, midsegment); (10)
01. points of concurrency related to triangles (centroid, incenter, orthocenter, and circumcenter); (10)
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)
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)
03. Make, test and establish the validity of conjectures about geometric properties and relationships using counterexample, inductive and deductive reasoning, and paragraph or two-column proof, including: (10)
03. test a conjecture using basic constructions made with a compass and straightedge or technology. (10)
03. prove the Pythagorean Theorem; (10)
03. prove theorems involving triangle similarity and congruence; (10)
03. prove theorems involving properties of lines, angles, triangles and quadrilaterals; (10)
S04. Patterns, Functions and Algebra
J. Describe and interpret rates of change from graphical and numerical data. (08-10)
09. Recognize and explain that the slopes of parallel lines are equal and the slopes of perpendicular lines are negative reciprocals. (10)

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Geometry Differentiated Lesson 15 - Inequalities and Triangle Inequalities

Math 10 Geometry Differentiated Lesson 15 - Inequalities and Triangle Inequalities

Standard Benchmark and Indicator
S03. Geometry and Spatial Sense
A. Formally define geometric figures. (08-10)
01. Formally define and explain key aspects of geometric figures, including: (10)
01. circles (radius, diameter, chord, circumference, major arc, minor arc, sector, segment, inscribed angle). (10)
01. interior and exterior angles of polygons; (10)
01. segments related to triangles (median, altitude, midsegment); (10)
01. points of concurrency related to triangles (centroid, incenter, orthocenter, and circumcenter); (10)
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)
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)
03. Make, test and establish the validity of conjectures about geometric properties and relationships using counterexample, inductive and deductive reasoning, and paragraph or two-column proof, including: (10)
03. test a conjecture using basic constructions made with a compass and straightedge or technology. (10)
03. prove the Pythagorean Theorem; (10)
03. prove theorems involving triangle similarity and congruence; (10)
03. prove theorems involving properties of lines, angles, triangles and quadrilaterals; (10)
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)
05. Solve simple linear and nonlinear equations and inequalities having square roots as coefficients and solutions. (10)
06. Solve equations and inequalities having rational expressions as coefficients and solutions. (10)
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)

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Geometry Differentiated Lesson 16 - Quadrilaterals, Parallelograms, Rectangles

Math 10 Geometry Differentiated Lesson 16 - Quadrilaterals, Parallelograms, Rectangles

Standard Benchmark and Indicator
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)
04. Construct right triangles, equilateral triangles, parallelograms, trapezoids, rectangles, rhombuses, squares and kites, using compass and straightedge or dynamic geometry software. (10)
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)
03. Make, test and establish the validity of conjectures about geometric properties and relationships using counterexample, inductive and deductive reasoning, and paragraph or two-column proof, including: (10)
03. test a conjecture using basic constructions made with a compass and straightedge or technology. (10)
03. prove the Pythagorean Theorem; (10)
03. prove theorems involving triangle similarity and congruence; (10)
03. prove theorems involving properties of lines, angles, triangles and quadrilaterals; (10)
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)
04. Use algebraic representations and functions to describe and generalize geometric properties and relationships. (10)
H. Solve systems of linear equations involving two variables graphically and symbolically. (08-10)
07. Solve systems of linear inequalities. (10)
J. Describe and interpret rates of change from graphical and numerical data. (08-10)
09. Recognize and explain that the slopes of parallel lines are equal and the slopes of perpendicular lines are negative reciprocals. (10)

Geometry Differentiated Lesson 17 – Review

Geometry Differentiated Lesson 18 - Midterm Exam

Geometry Differentiated Lesson 19 - Special Parallelograms and Quadrilaterals

Math 10 Geometry Differentiated Lesson 19 - Special Parallelograms and Quadrilaterals

Standard Benchmark and Indicator
S03. Geometry and Spatial Sense

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A. Formally define geometric figures. (08-10)
01. Formally define and explain key aspects of geometric figures, including: (10)
01. circles (radius, diameter, chord, circumference, major arc, minor arc, sector, segment, inscribed angle). (10)
01. interior and exterior angles of polygons; (10)
01. segments related to triangles (median, altitude, midsegment); (10)
01. points of concurrency related to triangles (centroid, incenter, orthocenter, and circumcenter); (10)
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)
04. Construct right triangles, equilateral triangles, parallelograms, trapezoids, rectangles, rhombuses, squares and kites, using compass and straightedge or dynamic geometry software. (10)
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)
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)
03. Make, test and establish the validity of conjectures about geometric properties and relationships using counterexample, inductive and deductive reasoning, and paragraph or two-column proof, including: (10)
03. test a conjecture using basic constructions made with a compass and straightedge or technology. (10)
03. prove the Pythagorean Theorem; (10)
03. prove theorems involving triangle similarity and congruence; (10)
03. prove theorems involving properties of lines, angles, triangles and quadrilaterals; (10)
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)
04. Use algebraic representations and functions to describe and generalize geometric properties and relationships. (10)
J. Describe and interpret rates of change from graphical and numerical data. (08-10)
09. Recognize and explain that the slopes of parallel lines are equal and the slopes of perpendicular lines are negative reciprocals. (10)

Geometry Differentiated Lesson 20 - Ratio, Proportion, and Similar Figures

Math 10 Geometry Differentiated Lesson 20 - Ratio, Proportion, and Similar Figures

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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)
04. Construct right triangles, equilateral triangles, parallelograms, trapezoids, rectangles, rhombuses, squares and kites, using compass and straightedge or dynamic geometry software. (10)
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)
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)
03. Make, test and establish the validity of conjectures about geometric properties and relationships using counterexample, inductive and deductive reasoning, and paragraph or two-column proof, including: (10)
03. test a conjecture using basic constructions made with a compass and straightedge or technology. (10)
03. prove the Pythagorean Theorem; (10)
03. prove theorems involving triangle similarity and congruence; (10)
03. prove theorems involving properties of lines, angles, triangles and quadrilaterals; (10)
I. Use right triangle trigonometric relationships to determine lengths and angle measures. (08-10)
02. Apply proportions and right triangle trigonometric ratios to solve problems involving missing lengths and angle measures in similar figures. (09)
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)
04. Use algebraic representations and functions to describe and generalize geometric properties and relationships. (10)

Geometry Differentiated Lesson 21 - Proportional Parts of Similar Triangles

Math 10 Geometry Differentiated Lesson 21 - Proportional Parts of Similar Triangles

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(08-10)
05. Construct congruent or similar figures using tools, such as compass, straightedge, and protractor or dynamic geometry software. (10)
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)
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)
03. Make, test and establish the validity of conjectures about geometric properties and relationships using counterexample, inductive and deductive reasoning, and paragraph or two-column proof, including: (10)
03. test a conjecture using basic constructions made with a compass and straightedge or technology. (10)
03. prove the Pythagorean Theorem; (10)
03. prove theorems involving triangle similarity and congruence; (10)
03. prove theorems involving properties of lines, angles, triangles and quadrilaterals; (10)
I. Use right triangle trigonometric relationships to determine lengths and angle measures. (08-10)
02. Apply proportions and right triangle trigonometric ratios to solve problems involving missing lengths and angle measures in similar figures. (09)
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)
03. Solve equations and formulas for a specified variable; e.g., express the base of a triangle in terms of the area and height. (10)
04. Use algebraic representations and functions to describe and generalize geometric properties and relationships. (10)
06. Solve equations and inequalities having rational expressions as coefficients and solutions. (10)

Geometry Differentiated Lesson 22 - Features of Right Triangles

Math 10 Geometry Differentiated Lesson 22 - Features of Right Triangles

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01. interior and exterior angles of polygons; (10)
01. segments related to triangles (median, altitude, midsegment); (10)
01. points of concurrency related to triangles (centroid, incenter, orthocenter, and circumcenter); (10)
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)
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)
02. Describe and compare characteristics of the following families of functions: square root, cubic, absolute value and basic trigonometric functions; e.g., general shape, possible number of roots, domain and range. (10)
F. Solve and graph linear equations and inequalities. (08-10)
10. Solve real-world problems that can be modeled using linear, quadratic, exponential or square root functions. (10)
G. Solve quadratic equations with real roots by graphing, formula and factoring. (08-10)
10. Solve real-world problems that can be modeled using linear, quadratic, exponential or square root functions. (10)

Geometry Differentiated Lesson 23 - Applications of Right Triangle Trigonometry

Math 10 Geometry Differentiated Lesson 23 - Applications of Right Triangle Trigonometry

Standard Benchmark and Indicator

Apply proportions and right triangle trigonometric ratios to solve problems
S04. Patterns, Functions and Algebra

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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)
02. Describe and compare characteristics of the following families of functions: square root, cubic, absolute value and basic trigonometric functions; e.g., general shape, possible number of roots, domain and range. (10)
F. Solve and graph linear equations and inequalities. (08-10)
10. Solve real-world problems that can be modeled using linear, quadratic, exponential or square root functions. (10)
G. Solve quadratic equations with real roots by graphing, formula and factoring. (08-10)
10. Solve real-world problems that can be modeled using linear, quadratic, exponential or square root functions. (10)

Geometry Differentiated Lesson 24 – Circles

Math 10 Geometry Differentiated Lesson 24 - Circles

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03. test a conjecture using basic constructions made with a compass and
03. prove the Pythagorean Theorem; (10)
03. prove theorems involving triangle similarity and congruence; (10)
03. prove theorems involving properties of lines, angles, triangles and

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quadrilaterals; (10)
10. Solve problems involving chords, radii, and arcs within the same circle. (10)
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)
03. Solve equations and formulas for a specified variable; e.g., express the base of a triangle in terms of the area and height. (10)
04. Use algebraic representations and functions to describe and generalize geometric properties and relationships. (10)
F. Solve and graph linear equations and inequalities. (08-10)
10. Solve real-world problems that can be modeled using linear, quadratic, exponential or square root functions. (10)
G. Solve quadratic equations with real roots by graphing, formula and factoring. (08-10)
10. Solve real-world problems that can be modeled using linear, quadratic, exponential or square root functions. (10)

Geometry Differentiated Lesson 25 - Inscribed Angles, Tangents, and Secants

Math 10 Geometry Differentiated Lesson 25 - Inscribed Angles, Tangents, and Secants

Standard Benchmark and Indicator
S03. Geometry and Spatial Sense
A. Formally define geometric figures. (08-10)
01. Formally define and explain key aspects of geometric figures, including: (10)
01. circles (radius, diameter, chord, circumference, major arc, minor arc, sector, segment, inscribed angle). (10)
01. interior and exterior angles of polygons; (10)
01. segments related to triangles (median, altitude, midsegment); (10)
01. points of concurrency related to triangles (centroid, incenter, orthocenter, and circumcenter); (10)
10. Solve problems involving chords, radii, and arcs within the same circle. (10)
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)
04. Construct right triangles, equilateral triangles, parallelograms, trapezoids, rectangles, rhombuses, squares and kites, using compass and straightedge or dynamic geometry software. (10)
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)
04. Use algebraic representations and functions to describe and generalize geometric properties and relationships. (10)
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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Geometry Differentiated Lesson 26 - Special Segments and Equations of Circles

Math 10 Geometry Differentiated Lesson 26 - Special Segments and Equations of Circles

Standard Benchmark and Indicator
S01. Number, Number Sense and Operations
D. Connect physical, verbal and symbolic representations of integers, rational numbers and irrational numbers. (08-10)
01. Connect physical, verbal and symbolic representations of irrational numbers; e.g., construct (10)
S03. Geometry and Spatial Sense
A. Formally define geometric figures. (08-10)
01. Formally define and explain key aspects of geometric figures, including: (10)
01. circles (radius, diameter, chord, circumference, major arc, minor arc, sector, segment, inscribed angle). (10)
01. interior and exterior angles of polygons; (10)
01. segments related to triangles (median, altitude, midsegment); (10)
01. points of concurrency related to triangles (centroid, incenter, orthocenter, and circumcenter); (10)
10. Solve problems involving chords, radii, and arcs within the same circle. (10)
S04. Patterns, Functions and Algebra
F. Solve and graph linear equations and inequalities. (08-10)
10. Solve real-world problems that can be modeled using linear, quadratic, exponential or square root functions. (10)
G. Solve quadratic equations with real roots by graphing, formula and factoring. (08-10)
08. Graph the quadratic relationship that defines circles. (10)

Geometry Differentiated Lesson 27 - Review of Lessons #19 Through #26

Geometry Differentiated Lesson 28 - Polygons, Tessellations, and Area

Math 10 Geometry Differentiated Lesson 28 - Polygons, Tessellations, and Area

Standard Benchmark and Indicator
S03. Geometry and Spatial Sense
A. Formally define geometric figures. (08-10)
01. Formally define and explain key aspects of geometric figures, including: (10)
01. circles (radius, diameter, chord, circumference, major arc, minor arc, sector, segment, inscribed angle). (10)
01. interior and exterior angles of polygons; (10)
01. segments related to triangles (median, altitude, midsegment); (10)
01. points of concurrency related to triangles (centroid, incenter, orthocenter, and circumcenter); (10)
E. Draw and construct representations of two- and three-dimensional geometric objects using a variety of tools, such as straightedge, compass and technology.

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(08-10)
05. Construct congruent or similar figures using tools, such as compass, straightedge, and protractor or dynamic geometry software. (10)
07. Perform reflections and rotations using compass and straightedge constructions and dynamic geometry software. (10)
F. Represent and model transformations in a coordinate plane and describe the results. (08-10)
09. Show and describe the results of combinations of translations, reflections and rotations (compositions); e.g., perform compositions and specify the result of a composition as the outcome of a single motion, when applicable. (10)
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)
03. Solve equations and formulas for a specified variable; e.g., express the base of a triangle in terms of the area and height. (10)
05. Solve simple linear and nonlinear equations and inequalities having square roots as coefficients and solutions. (10)
J. Describe and interpret rates of change from graphical and numerical data. (08-10)
09. Recognize and explain that the slopes of parallel lines are equal and the slopes of perpendicular lines are negative reciprocals. (10)

Geometry Differentiated Lesson 29 - Applications of Polygons and Circles

Math 10 Geometry Differentiated Lesson 29 - Applications of Polygons and Circles

Standard Benchmark and Indicator
S03. Geometry and Spatial Sense
A. Formally define geometric figures. (08-10)
10. Solve problems involving chords, radii, and arcs within the same circle. (10)
I. Use right triangle trigonometric relationships to determine lengths and angle measures. (08-10)
02. Apply proportions and right triangle trigonometric ratios to solve problems involving missing lengths and angle measures in similar figures. (09)
S05. Data Analysis and Probability
J. Compute probabilities of compound events, independent events, and simple dependent events. (08-10)
07. Model problems dealing with uncertainty with area models (geometric probability). (10)
K. Make predictions based on theoretical probabilities and experimental results. (08-10)
08. Differentiate and explain the relationship between the probability of an event and the odds of an event, and compute one given the other. (10)

Geometry Differentiated Lesson 30 - Surface Area

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Math 10 Geometry Differentiated Lesson 30 - Surface Area

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)
04. Use scale drawings and right triangle trigonometry to solve problems that include unknown distances and angle measures. (09)
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)
10. Solve real-world problems that can be modeled using linear, quadratic, exponential or square root functions. (10)

Geometry Differentiated Lesson 31 – Volume

Math 10 Geometry Differentiated Lesson 31 - Volume

Standard Benchmark and Indicator
S01. Number, Number Sense and Operations
D. Connect physical, verbal and symbolic representations of integers, rational numbers and irrational numbers. (08-10)
02. Explain the meaning of the (10)
F. Explain the effects of operations on the magnitude of quantities. (08-10)
03. Explain the effects of operations such as multiplication or division, and of computing powers and roots on the magnitude of quantities. (09)
I. Estimate, compute and solve problems involving scientific notation, square roots and numbers with integer exponents. (08-10)
04. Approximate the (10)
05. Estimate the solutions for problem situations involving square and cube roots. (09)
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
A. Formally define geometric figures. (08-10)
01. Formally define and explain key aspects of geometric figures, including: (10)
01. circles (radius, diameter, chord, circumference, major arc, minor arc, sector, segment, inscribed angle). (10)

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01. interior and exterior angles of polygons; (10)
01. segments related to triangles (median, altitude, midsegment); (10)
01. points of concurrency related to triangles (centroid, incenter, orthocenter, and circumcenter); (10)
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)
05. Construct congruent or similar figures using tools, such as compass, straightedge, and protractor or dynamic geometry software. (10)
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)
03. Make, test and establish the validity of conjectures about geometric properties and relationships using counterexample, inductive and deductive reasoning, and paragraph or two-column proof, including: (10)
03. test a conjecture using basic constructions made with a compass and straightedge or technology. (10)
03. prove the Pythagorean Theorem; (10)
03. prove theorems involving triangle similarity and congruence; (10)
03. prove theorems involving properties of lines, angles, triangles and quadrilaterals; (10)
I. Use right triangle trigonometric relationships to determine lengths and angle measures. (08-10)
02. Apply proportions and right triangle trigonometric ratios to solve problems involving missing lengths and angle measures in similar figures. (09)
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)
03. Solve equations and formulas for a specified variable; e.g., express the base of a triangle in terms of the area and height. (10)
04. Use algebraic representations and functions to describe and generalize geometric properties and relationships. (10)
05. Solve simple linear and nonlinear equations and inequalities having square roots as coefficients and solutions. (10)

Geometry Differentiated Lesson 32 - Graphing Equations of Lines

Math 10 Geometry Differentiated Lesson 32 - Graphing Equations of Lines

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and solutions. (10)
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)
08. Find linear equations that represent lines that pass through a given set of ordered pairs, and find linear equations that represent lines parallel or perpendicular to a given line through a specific point. (09)
10. Solve real-world problems that can be modeled using linear, quadratic, exponential or square root functions. (10)
G. Solve quadratic equations with real roots by graphing, formula and factoring. (08-10)
10. Solve real-world problems that can be modeled using linear, quadratic, exponential or square root functions. (10)
J. Describe and interpret rates of change from graphical and numerical data. (08-10)
09. Recognize and explain that the slopes of parallel lines are equal and the slopes of perpendicular lines are negative reciprocals. (10)
S05. Data Analysis and Probability
A. Create, interpret and use graphical displays and statistical measures to describe data; e.g., box-and-whisker plots, histograms, scatter plots, measures of center and variability. (08-10)
02. Create a scatterplot for a set of bivariate data, sketch the line of best fit, and interpret the slope of the line of best fit. (09)
02. Represent and analyze bivariate data using appropriate graphical displays (scatterplots, parallel box-and-whisker plots, histograms with more than one set of data, tables, charts, spreadsheets) with and without technology. (10)

Geometry Differentiated Lesson 33 - Loci

Math 10 Geometry Differentiated Lesson 33 - Loci

Standard Benchmark and Indicator
geometric properties and relationships. (10)
06. Solve equations and inequalities having rational expressions as coefficients and solutions. (10)
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)
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)
10. Solve real-world problems that can be modeled using linear, quadratic, exponential or square root functions. (10)
H. Solve systems of linear equations involving two variables graphically and symbolically. (08-10)

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H. Solve systems of linear equations involving two variables graphically and symbolically. (08-10)
07. Solve systems of linear inequalities. (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)
11. Solve real-world problems that can be modeled, using systems of linear equations and inequalities. (10)

Geometry Differentiated Lesson 34 - Mappings and Transformations

Math 10 Geometry Differentiated Lesson 34 - Mappings and Transformations

Standard Benchmark and Indicator
S03. Geometry and Spatial Sense
A. Formally define geometric figures. (08-10)
06. Identify the reflection and rotation symmetries of two- and three-dimensional figures. (10)
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)
07. Perform reflections and rotations using compass and straightedge constructions and dynamic geometry software. (10)
F. Represent and model transformations in a coordinate plane and describe the results. (08-10)
08. Derive coordinate rules for translations, reflections and rotations of geometric figures in the coordinate plane. (10)
09. Show and describe the results of combinations of translations, reflections and rotations (compositions); e.g., perform compositions and specify the result of a composition as the outcome of a single motion, when applicable. (10)
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 formally and with f (10)
02. Describe and compare characteristics of the following families of functions: square root, cubic, absolute value and basic trigonometric functions; e.g., general shape, possible number of roots, domain and range. (10)

Geometry Differentiated Lesson 35 – Review

Geometry Differentiated Lesson 36 – Final Exam