

Geometry

Standards, Benchmarks, and Indicators

Geometry Lesson 01 - Points, Lines, Planes, Angles

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

Geometry Lesson 02 - Line Segments and Coordinate Geometry

Math 10 Geometry Lesson 02 - Line Segments and Coordinate Geometry

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)
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 Lesson 03 – Logic

Math 10 Geometry Lesson 03 - 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)

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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 Lesson 04 – Proofs

Math 10 Geometry Lesson 04 - Proofs

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 Lesson 05 - Formulas and Problem Solving Strategies

Math 10 Geometry Lesson 05 - Formulas and Problem Solving Strategies

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 Lesson 06 - Review of Geometry Terminology and Proofs

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Geometry Lesson 07 - Angles, Lines, Transversals, and Parallel Lines

Math 10 Geometry Lesson 07 - Angles, Lines, Transversals, and Parallel Lines

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 Lesson 08 - Relationships of Parallel and Perpendicular Lines

Math 10 Geometry Lesson 08 - 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)
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)

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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 Lesson 09 - Properties of Triangles

Math 10 Geometry Lesson 09 - Properties of Triangles

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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 11 - Specialties with Triangles and Indirect Proofs

Math 10 Geometry Lesson 11 - 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)

Geometry Lesson 12 - Test over Lessons #1 through #11

Geometry Lesson 13 - Inequalities and Triangle Inequalities

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Math 10 Geometry Lesson 13 - 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)

Geometry Lesson 14 - Quadrilaterals, Parallelograms, Rectangles

Math 10 Geometry Lesson 14 - 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)

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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 Lesson 15 - Special Parallelograms and Quadrilaterals

Math 10 Geometry Lesson 15 - Special Parallelograms and Quadrilaterals

Standard Benchmark and Indicator

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

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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 Lesson 16 - Ratio, Proportion, and Similar Figures

Math 10 Geometry Lesson 16 - Ratio, Proportion, and Similar Figures

Standard Benchmark and Indicator

E. Draw and construct representations of two- and three-dimensional geometric objects using a variety of tools, such as straightedge, compass and technology.
04. Construct right triangles, equilateral triangles, parallelograms, trapezoids, rectangles, rhombuses, squares and kites, using compass and straightedge or
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
03. Make, test and establish the validity of conjectures about geometric properties and relationships using counterexample, inductive and deductive
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)

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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 17 – Review

Geometry Lesson 18 - Midterm Exam

Geometry Lesson 19 - Proportional Parts of Similar Triangles

Math 10 Geometry Lesson 19 - Proportional Parts of Similar Triangles

Standard Benchmark and Indicator

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.
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
03. Make, test and establish the validity of conjectures about geometric properties and relationships using counterexample, inductive and deductive
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

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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 Lesson 20 - Features of Right Triangles

Math 10 Geometry Lesson 20 - Features of Right Triangles

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)
S03. Geometry and Spatial Sense
A. Formally define geometric figures. (08-10)
01. Formally define and explain key aspects of geometric figures, including: (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)
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 Lesson 21 - Applications of Right Triangle Trigonometry

Math 10 Geometry Lesson 21 - Applications of Right Triangle Trigonometry

Standard Benchmark and Indicator

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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)
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
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 Lesson 22 – Circles

Math 10 Geometry Lesson 22 - Circles

Standard Benchmark and Indicator

C. Recognize and apply angle relationships in situations involving intersecting lines, perpendicular lines and parallel lines. (08-10)
10. Solve problems involving chords, radii, and arcs within the same circle. (10)
H. Establish the validity of conjectures about geometric objects, their properties and relationships by counter-example, inductive and deductive reasoning, and
03. Make, test and establish the validity of conjectures about geometric properties and relationships using counterexample, inductive and deductive

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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)
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 Lesson 23 - Inscribed Angles, Tangents, and Secants

Math 10 Geometry Lesson 23 - 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,
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
10. Solve problems involving chords, radii, and arcs within the same circle. (10)
E. Draw and construct representations of two- and three-dimensional geometric
04. Construct right triangles, equilateral triangles, parallelograms, trapezoids,
S04. Patterns, Functions and Algebra
D. Use algebraic representations, such as tables, graphs, expressions, functions
04. Use algebraic representations and functions to describe and generalize
G. Solve quadratic equations with real roots by graphing, formula and factoring.
10. Solve quadratic equations with real roots by factoring, graphing, using the

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quadratic formula and with technology. (09)

Geometry Lesson 24 - Special Segments and Equations of Circles

Math 10 Geometry Lesson 24 - 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 Lesson 25 - Polygons, Tessellations, and Area

Math 10 Geometry Lesson 25 - Polygons, Tessellations, and Area

Standard Benchmark and Indicator
E. Draw and construct representations of two- and three-dimensional geometric objects using a variety of tools, such as straightedge, compass and technology.
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)

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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 Lesson 26 - Applications of Polygons and Circles

Math 10 Geometry Lesson 26 - Applications of Polygons and Circles

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)
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 Lesson 27 - Review of Lessons #19 Through #26

Geometry Lesson 28 - Surface Area

Math 10 Geometry Lesson 28 - Surface Area

Standard Benchmark and Indicator

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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 Lesson 29 - Volume

Math 10 Geometry Lesson 29 - Volume

Standard Benchmark and Indicator

(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)

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Standards, Benchmarks, and Indicators

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)
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)

Geometry Lesson 30 - Graphing Equations of Lines

Math 10 Geometry Lesson 30 - Graphing Equations of Lines

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)
06. Solve equations and inequalities having rational expressions as coefficients and solutions. (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)
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
02. Represent and analyze bivariate data using appropriate graphical displays (scatterplots, parallel box-and-whisker plots, histograms with more than one set

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(scatterplots, parallel box-and-whisker plots, histograms with more than one set of data, tables, charts, spreadsheets) with and without technology. (10)

Geometry Lesson 31 - Coordinate Proofs, Vectors, and Points in Space

Math 10 Geometry Lesson 31 - Coordinate Proofs, Vectors, and Points in Space

Standard Benchmark and Indicator
S01. Number, Number Sense and Operations
A. Demonstrate that vectors and matrices are systems having some of the same properties of the real number system. (11-12)
02. Determine what properties hold for vector addition and multiplication, and for scalar multiplication. (11)
B. Develop an understanding of properties of and representations for addition and multiplication of vectors and matrices. (11-12)
05. Model, using the coordinate plane, vector addition and scalar multiplication. (11)
D. Demonstrate fluency in operations with real numbers, vectors and matrices, using mental computation or paper and pencil calculations for simple cases and technology for more complicated cases. (11-12)
04. Use matrices to represent given information in a problem situation. (11)
06. Compute sums, differences and products of matrices using paper and pencil calculations for simple cases, and technology for more complicated cases. (11)
09. Use vector addition and scalar multiplication to solve problems. (11)
S03. Geometry and Spatial Sense
B. Represent transformations within a coordinate system using vectors and matrices. (11-12)
04. Recognize and compare specific shapes and properties in multiple geometries; e.g., plane, spherical, and hyperbolic. (12)
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)
10. Solve problems involving chords, radii, and arcs within the same circle. (10)

Geometry Lesson 32 – Loci

Math 10 Geometry Lesson 32 - Loci

Standard Benchmark and Indicator

Geometry

Standards, Benchmarks, and Indicators

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)
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)
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 Lesson 33 - Mappings and Transformations

Math 10 Geometry Lesson 33 - 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

Standards, Benchmarks, and Indicators

Geometry Lesson 34 - Uncertainty in Measurements; Combinations and Permutations

Math 10 Geometry Lesson 34 - Uncertainty in Measurements; Combinations and Permutations

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)
03. Use factorial notation and computations to represent and solve problem situations involving arrangements. (10)
S02. Measurement
A. Solve increasingly complex non-routine measurement problems and check for reasonableness of results. (08-10)
01. Explain how a small error in measurement may lead to a large error in calculated results. (10)
02. Calculate relative error. (10)
03. Explain the difference between absolute error and relative error in measurement. (10)
04. Give examples of how the same absolute error can be problematic in one situation but not in another; e.g., compare "accurate to the nearest foot" when measuring the height of a person versus when measuring the height of a mountain. (10)

Geometry Lesson 35 - Data Analysis

Math 10 Geometry Lesson 35 - Data Analysis

Standard Benchmark and Indicator
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. 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)
03. Display bivariate data where at least one variable is categorical. (10)
04. Identify outliers on a data display; e.g., use the interquartile range to identify outliers on a box-and-whisker plot. (10)
06. Interpret the relationship between two variables using multiple graphical displays and statistical measures; e.g., scatterplots, parallel box-and-whisker plots, and measures of center and spread. (10)
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)
01. Describe measures of center and the range verbally, graphically and algebraically. (10)
D. Find, use and interpret measures of center and spread, such as mean and quartiles, and use those measures to compare and draw conclusions about sets of data. (08-10)
06. Interpret the relationship between two variables using multiple graphical displays and statistical measures; e.g., scatterplots, parallel box-and-whisker plots, and measures of center and spread. (10)
G. Describe sampling methods and analyze the effects of method chosen on how well the resulting sample represents the population. (08-10)

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05. Provide examples and explain how a statistic may or may not be an attribute of the entire population; e.g., intentional or unintentional bias may be present. (10)

Geometry Lesson 36 - Final Exam