



Content/Discipline Geometry, Term 2

<http://mcsportal.net>

Marking Period 1

Topic and Essential Question

Unit 7 - (1) How Do We Apply the Pythagorean Theorem? (2) How can we determine if a triangle is a right triangle? (3) What are the properties associated with altitudes within right triangles? (4) What is the ratio of the side lengths of a 45-45-90 triangle? (5) What is the ratio of the side lengths of a 30-60-90 triangle? (6) How is the tangent ratio applied? (7) How do we apply the sine ratio? (8) How do we apply the cosine ratio? (9) How are right triangles “solved”?

Unit 8 – (1) How do we find the angle measures in polygons? (2) How do we use properties of parallelograms? (3) How do we prove a quadrilateral is a parallelogram? (4) What are the properties of rhombuses, rectangles, and squares? (5) How do we write proofs for parallelograms? (6) What are the properties of trapezoids? (7) What are the properties of kites? (8) How do we identify special quadrilaterals?

Unit/Topics

Unit 7- Right Triangles and Trigonometry

Unit 8- Quadrilaterals

SWBAT/Objectives

Unit 7 – 16 days Students will be able to...

- Apply the Pythagorean Theorem,
- Use the converse of the Pythagorean Theorem
- Use Similar Right Triangles
- Understand properties of special right triangles
- Apply the tangent ratio
- Apply the sine and cosine ratios
- Solve right triangles

Unit 8 – 12 days Students will be able to...

- Find angle measures for polygons
- Use properties of parallelograms
- Show that a quadrilateral is a parallelogram
- Understand the properties of rhombuses, rectangles, and squares

- Use the properties of trapezoids and kites
- Identify special quadrilaterals

Vocabulary/Key Terms

Unit 7: pythagorean triple, trigonometric ratio, tangent, sine, cosine, angle of elevation, solve a right triangle, inverse tangent, inverse sine, and inverse cosine

Unit 8: diagonal, parallelogram, rhombus, rectangle, square, trapezoid, isosceles trapezoid, midsegment of a trapezoid, kite

Assessments:

- Classwork
- Lesson Summary
- Homework
- Warm-up (DO NOW) Quiz next day
- Unit Tests
- Binder Check

Common Core Standards:

Common Core Standards for Math Practices:
Common Core Standards Addressed

G-SRT.4	Prove theorems about triangles. <i>Theorems include: a line parallel to one side of a triangle divides the other two proportionally, and conversely; the Pythagorean Theorem proved using triangle similarity.</i>
G-SRT.5	Use congruence and similarity criteria for triangles to solve problems and to prove relationships in geometric figures.
G-SRT.8	Use trigonometric ratios and the Pythagorean Theorem to solve right triangles in applied problems.
G-CO.11	Prove theorems about parallelograms. <i>Theorems include: opposite sides are congruent, opposite angles are congruent, the diagonals of a parallelogram bisect each other, and conversely, rectangles are parallelograms with congruent diagonals.</i>
G-GM.3	Apply geometric methods to solve design problems (e.g., designing an object or structure to satisfy physical constraints or minimize cost; working with typographic grid systems based on ratios).
G-PFE.4	Use coordinates to prove simple geometric theorems algebraically. <i>For example, prove or disprove that a figure defined by four given points in the coordinate plane is a rectangle; prove or disprove that the point (1, -3) lies on the circle centered at the origin and containing the point (0, 2).</i>
G-SRT.1	Verify experimentally the properties of dilations given by a center and a scale factor: a. A dilation takes a line not passing through the center of the dilation to a parallel line, and leaves a line passing through the center unchanged. b. The dilation of a line segment is longer or shorter in the ratio given by the scale

	factor.
G-SRT.2	Given two figures, use the definition of similarity in terms of similarity transformations to decide if they are similar; explain using similarity transformations the meaning of similarity for triangles as the equality of all corresponding pairs of angles and the proportionality of all corresponding pairs of sides.
G-SRT.3	Use the properties of similarity transformations to establish the AA criterion for two triangles to be similar.

G-CO.9	Prove theorems about lines and angles. <i>Theorems include: vertical angles are congruent; when a transversal crosses parallel lines, alternate interior angles are congruent and corresponding angles are congruent; points on a perpendicular bisector of a line segment are exactly those equidistant from the segment's endpoints.</i>
G-CO.12	Make formal geometric constructions with a variety of tools and methods (compass and straightedge, string, reflective devices, paper folding, dynamic geometric software, etc.). <i>Copying a segment; copying an angle; bisecting a segment; bisecting an angle; constructing perpendicular lines, including the perpendicular bisector of a line segment; and constructing a line parallel to a given line through a point not on the line.</i>

- Flexible grouping
- Cooperative Learning
- Visual Learning – SMART Board, White board
- Visual and interactive questions using the Smart board

Differentiated Instruction:

- Students with ELL's will watch videos (the video has English and Spanish both versions) and additional tutorials about the lesson through the class website.
- Students are allowed extra time for works and assessments.

ELLs:

- Preview the Key Terms to give students access to context.
- Assign chapter summary to give less proficient readers access to content.

SWDs:

- Have gifted students assist students that are not as gifted.
- Ask students to take on leadership roles when working in groups.

High-Achievers:

Resources/Books

- ✚ Graphing Calculator for individual use inside and outside of the classroom.
- ✚ Math XL for online HW and study plan
- ✚ Schoology/YouTube for unit test reviews

Homework: Per Teacher



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Marking Period 2

Topic and Essential Question

Unit 9 - (1) What are Rigid Motion Transformations? How do we translate figures? (2) What is a reflection? (3) How do we perform rotations? (4) What are dilations? How do we perform similarity transformations? (5) How do we apply properties of dilations? (6) How do we apply compositions of transformations? (7) How do we identify symmetry?

Unit 10 – (1) What are the properties of tangents? (2) How do we find the arc measure in a circle? (3) What are the properties of chords? (4) What are the properties of inscribed angles? (5) What are other relationships in circles? (6) How do we write and graph equations of circles in center –radius form? (7) How do we write and graph equations of circles in General Form?

Unit 11 - (1) How do we find area of parallelograms, trapezoids and kites? (2) How do we find circumference and arc length in circles? (3) How do we find area and sector area of circles? (4) How do we find area of regular polygons?

Unit/Topics

Unit 9- Transformations

Unit 10- Circles

Unit 11- Measuring Length and Area

SWBAT/Objectives

Unit 9 – 18 days Students will be able to...

- Understand and apply rigid transformation rules, translate figures determining image and pre-image
- Recognize reflection symbols and apply reflections on main lines of coordinate plane
- Recognize and apply properties of rotations of 90° , 180° , 270° around the origin
- Understand and apply properties of dilations to transform a figure
- Identify line, rotational and point symmetries
- Understand which transformations preserve congruence, order and isometry

Unit 10 – 10 days Students will be able to...

- Identify the properties of tangents
- Determine the arc measures in a circle
- Understand and apply the property of chords

- Understand and apply the properties of central, inscribed, and other angles in circles
- Use the properties of segment lengths
- Write and graph equations of circles in center-radius and general form

Unit 11 – 11 days Students will be able to...

- Develop and use formulas for the area of triangles, parallelograms, trapezoids, and other polygons
- Use ratios to find areas of similar polygons
- Use ratios to find missing lengths of similar figures
- Explore circles relating to arc length and circumferences to area of sectors
- Develop and use formula for the area of a regular polygon
- Use lengths of segments and areas of regions to calculate probabilities

Vocabulary/Key Terms

Unit 9: transformation, pre-image, image, rigid transformation, isometry, reflection, translation, rotation, line of reflection, symmetry, composition of transformations, dilations, vectors, center of rotation, solids of revolution, glide reflections, tessellations, scale factor

Unit 10: circle, center, radius, diameter, tangent, secant, arc, central angle, inscribed angle, chord, major arc, minor arc, intercepted arc, secant segment, external segment, locus, center-radius equation of a circle, general equation of a circle

Unit 11: bases of parallelogram, height of parallelogram, height of trapezoid, circumference, arc length, sector of a circle, center of a polygon, radius of a polygon, apothem of a polygon, central angle of a regular polygon

Assessments:

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Common Core Standards:

Common Core Standards Addressed

G-SRT.1	Verify experimentally the properties of dilations given by a center and a scale factor: a. A dilation takes a line not passing through the center of the dilation to a parallel line, and leaves a line passing through the center unchanged. b. The dilation of a line segment is longer or shorter in the ratio given by the scale factor.
G-SRT.2	Given two figures, use the definition of similarity in terms of similarity transformations to decide if they are similar; explain using similarity transformations the meaning of similarity for triangles as the equality of all corresponding pairs of angles and the proportionality of all corresponding pairs of sides.

G-SRT.3	Use the properties of similarity transformations to establish the AA criterion for two triangles to be similar.
G-SRT.9 (+)	Derive the formula $A = \frac{1}{2} ab \sin(C)$ for the area of a triangle by drawing an auxiliary line from a vertex perpendicular to the opposite side.
G-CO.4	Develop definitions of rotations, reflections, and translations in terms of angles, circles, perpendicular lines, parallel lines, and line segments.
G- CO.5	Given a geometric figure and a rotation, reflection, or translation, draw the transformed figure using, e.g., graph paper, tracing paper, or geometry software. Specify a sequence of transformations that will carry a given figure onto another.
G-GC.2	Identify and describe relationships among inscribed angles, radii, and chords. <i>Include the relationship between central, inscribed, and circumscribed angles; inscribed angles on a diameter are right angles; the radius of a circle is perpendicular to the tangent where the radius intersects the circle.</i>
G-GC.5	Derive using similarity the fact that the length of the arc intercepted by an angle is proportional to the radius, and define the radian measure of the angle as the constant of proportionality; derive the formula for the area of a sector.
G-GMD.1	Give an informal argument for the formulas for the circumference of a circle, area of a circle, volume of a cylinder, pyramid, and cone. <i>Use dissection arguments, Cavalieri's principle, and informal limit arguments.</i>
G-MG.1	Use geometric shapes, their measures, and their properties to describe objects (e.g., modeling a tree trunk or a human torso as a cylinder).
G-GC.1	Prove that all circles are similar.
G-GC.2	Identify and describe relationships among inscribed angles, radii, and chords. <i>Include the relationship between central, inscribed, and circumscribed angles; inscribed angles on a diameter are right angles; the radius of a circle is perpendicular to the tangent where the radius intersects the circle.</i>
G-GC.4 (+)	Construct a tangent line from a point outside a given circle to the circle.
G-GPE.1	Derive the equation of a circle of given center and radius using the Pythagorean Theorem; complete the square to find the center and radius of a circle given by an equation.

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Homework: Per Teacher



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Marking Period 3

Topic and Essential Question

Unit 12 – (1) How do we find surface area of prisms and cylinders? (2) How do we find surface area of pyramids? (3) How do we find surface area of cones? (4) How do we find volume of right prisms and cylinders? (5) How do we find volume of pyramids and cones? (6) How do we find volume of composite figures? (7) How do we find surface area of volume and spheres?

Regents Review – (1) Midpoint and Distance (2) Parallel and perpendicular lines (3-4) Graphing a system of equations (5) Angles (6) More angles (7) Properties of polygons (8) Special centers of triangles and coordinate proof (9-11) Construction (12) Proofs (13) Similarity (14-15) Transformations (16) Chords and Tangents (17) Segments in a circle (18) Segments, arcs, and circles (19) Circles and volumes (20) Special right triangles (21) Planes and Lines

Unit/Topics

Unit 12- Surface Area and Volumes of Solids

Regents Review -

SWBAT/Objectives

Unit 12 – 9 days Students will be able to...

- Identify and name solids, including Platonic solids
- Use Euler's theorem to relate the number of faces, vertices and edges of solids
- Describe cross sections of solids
- Find the surface areas of lateral areas of prisms and cylinders and use nets to find surface areas
- Find the surface area and volume of solids
- Use scale factors of similar solids to compare the ratios of the surface areas and the ratios of the volumes of solids

Regents Review – 21 days

Unit 1 Students will be able to...

- Name and sketch geometric figures,
- Use postulates to identify congruent segments
- Find lengths of segments in coordinate planes
- Find midpoint of a segment

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- Name, measure and classify angles
 - Identify complementary and supplementary angles
 - Find circumference and area of circles

Unit 2 Students will be able to...

- Describe patterns, including visual and number patterns
- Use properties of equality and laws of logic to prove basic theorems about congruence, supplementary angles, complementary angles, and vertical angles

Unit 3 Students will be able to...

- Classify angle pairs formed by three intersecting lines
- Study angle pairs formed by a line that intersects two parallel lines
- Use angle relationships to prove lines parallel
- Investigate slopes of lines and study the relationship between slopes of parallel and perpendicular lines
- Find equations of parallel and perpendicular lines
- Prove theorems about perpendicular lines and find the distance between parallel lines in the coordinate plane

Unit 4 Students will be able to...

- Find the measures of missing interior or exterior angles
- Match corresponding parts of congruent figures
- Prove triangles are congruent based on given information, or determine not enough information
- Prove parts of triangles are congruent by first proving triangle congruence
- Apply base angle theorems to isosceles and equilateral triangles

Unit 5 Students will be able to...

- Apply and prove properties of midsegments in triangles
- Use variables as coordinates, and perform basic coordinate proofs using slopes or lengths
- Apply the properties of perpendicular bisectors and construct the circumcenter of a triangle
- Apply the properties of angle bisectors and construct the incenter of a triangle
- Apply the properties of medians and construct the centroid of a triangle
- Apply the properties of altitudes and construct the orthocenter of a triangle

Unit 6 Students will be able to...

- Model problems using ratios, proportions, and calculate the geometric mean
 - Match corresponding parts of similar figures
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- Prove triangles are similar based on given information, or determine not enough information
 - Find lengths of whole or partial sides, or the measures of angles, of similar triangles

Unit 7 Students will be able to...

- Apply the Pythagorean Theorem,
- Use the converse of the Pythagorean Theorem
- Use Similar Right Triangles
- Understand properties of special right triangles
- Apply the tangent ratio
- Apply the sine and cosine ratios
- Solve right triangles

Unit 8 Students will be able to...

- Find angle measures for polygons
- Use properties of parallelograms
- Show that a quadrilateral is a parallelogram
- Understand the properties of rhombuses, rectangles, and squares
- Use the properties of trapezoids and kites
- Identify special quadrilaterals

Unit 9 Students will be able to...

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 - Understand and apply the property of chords
 - Understand and apply the properties of central, inscribed, and other angles in circles
 - Use the properties of segment lengths
-

- Write and graph equations of circles in center-radius and general form

Unit 11 Students will be able to...

- Develop and use formulas for the area of triangles, parallelograms, trapezoids, and other polygons
- Use ratios to find areas of similar polygons
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- Find the surface area and volume of solids
- Use scale factors of similar solids to compare the ratios of the surface areas and the ratios of the volumes of solids

Vocabulary/Key Terms

Unit 12: polyhedron, platonic solids, cross section, prism, surface area, lateral area, net, right prism, oblique prism, cylinder, right cylinder, pyramid, regular pyramid, cone, right cone, volume, sphere, great circle, hemisphere, similar solids

Unit 1: undefined terms: point, line, plane; line segment, endpoints, rays, opposite rays, postulate, axiom, congruent segments, midpoint, segment bisector, acute, right, and obtuse angles, angle bisector, linear pair, vertical angles, polygon, convex, concave, equilateral, equiangular, regular

Unit 2: conjecture, proof, two-column proof, theorem, property, segments, angles, segment addition postulate, angle addition postulate, addition proportion, subtraction property, division property, multiplication property, distributive property, reflexive property, symmetric property, and transitive property

Unit 3: parallel lines, skew lines, parallel planes, transversal, corresponding angles, alternate interior angles, alternate exterior angles, same-side interior angles, slope, slope-intercept form, distance from point to line

Unit 4: scalene, isosceles, equilateral, acute/right/obtuse/equilateral triangle, interior/exterior angles, congruent/congruence, corresponding angles/sides/statement, SSS/SAS/ASA/AAS/HL congruence, overlapping, vertex angle, legs, base, base angles, converse

Unit 5: midsegment, coordinate proof, perpendicular bisectors, equidistant, concurrent, point of concurrency, circumcenter, circumscribe, construct, angle bisector, incenter, median, centroid, center of mass, altitudes, orthocenter, Hinge Theorem, indirect proof, proof by contradiction

Unit 6: ratio, simplest form, equivalent ratios, proportion, geometric mean, reciprocal property, scale drawing, similar, scale factor, AAA/AA/SSS/SAS Similarity, Triangle Proportionality Theorem

Unit 7: pythagorean triple, trigonometric ratio, tangent, sine, cosine, angle of elevation, solve a right triangle, inverse tangent, inverse sine, and inverse cosine

Unit 8: diagonal, parallelogram, rhombus, rectangle, square, trapezoid, isosceles trapezoid, midsegment of a trapezoid, kite

Unit 9: transformation, pre-image, image, rigid transformation, isometry, reflection, translation, rotation, line of reflection, symmetry, composition of transformations, dilations, vectors, center of rotation, solids of revolution, glide reflections, tessellations, scale factor

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Assessments:

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Common Core Standards:

Common Core Standards for Math Practices:
Common Core Standards Addressed

G-GMD.3	Use volume formulas for cylinders, pyramids, cones, and spheres to solve problems.
G-GMD.4	Identify the shapes of two-dimensional cross-sections of three-dimensional objects, and identify three-dimensional objects generated by rotations of two-dimensional objects.
G-MG.2	Apply concepts of density based on area and volume in modeling situations (e.g., persons per square mile, BTUs per cubic foot).

G-MG.3	Apply geometric methods to solve design problems (e.g., designing an object or structure to satisfy physical constraints or minimize cost; working with typographic grid systems based on ratios).
G-CO.1	Know precise definitions of angle, circle, perpendicular line, parallel line, and line segment, based on the undefined notions of point, line, distance along a line, and distance around a circular arc.
G-CO.4	Develop definitions of rotations, reflections, and translations in terms of angles, circles, perpendicular lines, parallel lines, and line segments.
G-CO.5	Given a geometric figure and a rotation, reflection, or translation, draw the transformed figure using, e.g., graph paper, tracing paper, or geometry software. Specify a sequence of transformations that will carry a given figure onto another.
G-CO.2	Represent transformations in the plane using, e.g., transparencies and geometry software; describe transformations as functions that take points in the plane as inputs and give other points as outputs. Compare transformations that preserve distance and angle to those that do not (e.g., translation versus horizontal stretch).
G-CO.5	Given a geometric figure and a rotation, reflection, or translation, draw the transformed figure using, e.g., graph paper, tracing paper, or geometry software. Specify a sequence of transformations that will carry a given figure onto another.
G-CO.6	Use geometric descriptions of rigid motions to transform figures and to predict the effect of a given rigid motion on a given figure; given two figures, use the definition of congruence in terms of rigid motions to decide if they are congruent.
G-CO.7	Use the definition of congruence in terms of rigid motions to show that two triangles are congruent if and only if corresponding pairs of sides and corresponding pairs of angles are congruent.
G-CO.8	Explain how the criteria for triangle congruence (ASA, SAS, and SSS) follow from the definition of congruence in terms of rigid motions.
G-CO.9	Prove theorems about lines and angles. <i>Theorems include: vertical angles are congruent; when a transversal crosses parallel lines, alternate interior angles are congruent and corresponding angles are congruent; points on a perpendicular bisector of a line segment are exactly those equidistant from the segment's endpoints.</i>
G-CO.10	Prove theorems about triangles. <i>Theorems include: measures of interior angles of a triangle sum to 180°; base angles of isosceles triangles are congruent; the segment joining midpoints of two sides of a triangle is parallel to the third side and half the length; the medians of a triangle meet at a point.</i>
G-CO.11	Prove theorems about parallelograms. <i>Theorems include: opposite sides are congruent, opposite angles are congruent, the diagonals of a parallelogram bisect each other, and conversely, rectangles are parallelograms with congruent diagonals.</i>

G-CO.12	Make formal geometric constructions with a variety of tools and methods (compass and straightedge, string, reflective devices, paper folding, dynamic geometric software, etc.). <i>Copying a segment; copying an angle; bisecting a segment; bisecting an angle; constructing perpendicular lines, including the perpendicular bisector of a line segment; and constructing a line parallel to a given line through a point not on the line.</i>
G-CO.13	Construct an equilateral triangle, a square, and a regular hexagon inscribed in a circle.
G-GPE.5	Prove the slope criteria for parallel and perpendicular lines and use them to solve geometric problems (e.g., find the equation of a line parallel or perpendicular to a given line that passes through a given point).
G-PFE.4	Use coordinates to prove simple geometric theorems algebraically. <i>For example, prove or disprove that a figure defined by four given points in the coordinate plane is a rectangle; prove or disprove that the point (1, -3) lies on the circle centered at the origin and containing the point (0, 2).</i>
G-PFE.6	Find the point on a directed line segment between two given points that partitions the segment in a given ratio.
A-CED.1	Create equations in one variable and use them to solve problem.
A-CED.4	Rearrange formulas to highlight a quantity of interest, using the same reasoning as solving equations.
G-GM.3	Apply geometric methods to solve design problems (e.g., designing an object or structure to satisfy physical constraints or minimize cost; working with typographic grid systems based on ratios).
G-C.1	Prove that all circles are similar.
G-C.3	Construct the inscribed and circumscribed circles of a triangle.
G-MG.3	Apply geometric methods to solve design problems (e.g., designing an object or structure to satisfy physical constraints or minimize cost; working with typographic grid systems based on ratios)._
G-SRT.1	Verify experimentally the properties of dilations given by a center and a scale factor: a. A dilation takes a line not passing through the center of the dilation to a parallel line, and leaves a line passing through the center unchanged. b. The dilation of a line segment is longer or shorter in the ratio given by the scale factor.
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G-SRT.4	Prove theorems about triangles. <i>Theorems include: a line parallel to one side of a triangle divides the other two proportionally, and conversely; the Pythagorean Theorem proved using triangle similarity.</i>
G-SRT.5	Use congruence and similarity criteria for triangles to solve problems and to prove relationships in geometric figures.
G-SRT.8	Use trigonometric ratios and the Pythagorean Theorem to solve right triangles in applied problems.
G-SRT.9 (+)	Derive the formula $A = \frac{1}{2} ab \sin(C)$ for the area of a triangle by drawing an auxiliary line from a vertex perpendicular to the opposite side.
G-GC.2	Identify and describe relationships among inscribed angles, radii, and chords. <i>Include the relationship between central, inscribed, and circumscribed angles; inscribed angles on a diameter are right angles; the radius of a circle is perpendicular to the tangent where the radius intersects the circle.</i>
G-GC.5	Derive using similarity the fact that the length of the arc intercepted by an angle is proportional to the radius, and define the radian measure of the angle as the constant of proportionality; derive the formula for the area of a sector.
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G-MG.1	Use geometric shapes, their measures, and their properties to describe objects (e.g., modeling a tree trunk or a human torso as a cylinder).
G-GC.1	Prove that all circles are similar.
G-GC.2	Identify and describe relationships among inscribed angles, radii, and chords. <i>Include the relationship between central, inscribed, and circumscribed angles; inscribed angles on a diameter are right angles; the radius of a circle is perpendicular to the tangent where the radius intersects the circle.</i>
G-GC.4 (+)	Construct a tangent line from a point outside a given circle to the circle.
G-GPE.1	Derive the equation of a circle of given center and radius using the Pythagorean Theorem; complete the square to find the center and radius of a circle given by an equation.

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