

Geometry

Reasoning, Lines and Transformations

RLT.1 The student will translate logic statements, identify conditional statements, and use and interpret Venn diagrams. [G.RLT.1](#)

RLT.2 The student will analyze, prove, and justify the relationships of parallel lines cut by a transversal. [G.RLT.2](#)

RLT.3 The student will solve problems, including contextual problems, involving symmetry and transformation. [G.RLT.3](#)

Translate propositional statements and compound statements into symbolic form, including negations ($\sim p$, read “not p ”), conjunctions ($p \wedge q$, read “ p and q ”), disjunctions ($p \vee q$, read “ p or q ”), conditionals ($p \rightarrow q$, read “if p then q ”), and biconditionals ($p \leftrightarrow q$, read “ p if and only if q ”), including statements representing geometric relationships. [G.RLT.1.A](#)

a Translate propositional statements and compound statements into symbolic form, including negations ($\sim p$, read “not p ”), conjunctions ($p \wedge q$, read “ p and q ”), disjunctions ($p \vee q$, read “ p or q ”), conditionals ($p \rightarrow q$, read “if p then q ”), and biconditionals ($p \leftrightarrow q$, read “ p if and only if q ”), including statements representing geometric relationships. [G.RLT.1.A](#)

Identify and determine the validity of the converse, inverse, and contrapositive of a conditional statement, and recognize the connection between a biconditional statement and a true conditional statement with a true converse, including statements representing geometric relationships. [G.RLT.1.B](#)

b Identify and determine the validity of the converse, inverse, and contrapositive of a conditional statement, and recognize the connection between a biconditional statement and a true conditional statement with a true converse, including statements representing geometric relationships. [G.RLT.1.B](#)

Use Venn diagrams to represent set relationships, including union, intersection, subset, and negation. [G.RLT.1.C](#)

c Use Venn diagrams to represent set relationships, including union, intersection, subset, and negation. [G.RLT.1.C](#)

Interpret Venn diagrams, including those representing contextual situations. [G.RLT.1.D](#)

d Interpret Venn diagrams, including those representing contextual situations. [G.RLT.1.D](#)

Prove and justify angle pair relationships formed by two parallel lines and a transversal, including: [G.RLT.2.A](#)

i corresponding angles; [G.RLT.2.A.I](#)

ii alternate interior angles; [G.RLT.2.A.II](#)

iii alternate exterior angles; [G.RLT.2.A.III](#)

iv same-side (consecutive) interior angles; and [G.RLT.2.A.IV](#)

v same-side (consecutive) exterior angles. [G.RLT.2.A.V](#)

Prove two or more lines are parallel given angle measurements expressed numerically or algebraically. [G.RLT.2.B](#)

b Prove two or more lines are parallel given angle measurements expressed numerically or algebraically. [G.RLT.2.B](#)

Solve problems by using the relationships between pairs of angles formed by the intersection of two parallel lines and a transversal. [G.RLT.2.C](#)

c Solve problems by using the relationships between pairs of angles formed by the intersection of two parallel lines and a transversal. [G.RLT.2.C](#)

Locate, count, and draw lines of symmetry given a figure, including figures in context. [G.RLT.3.A](#)

a Locate, count, and draw lines of symmetry given a figure, including figures in context. [G.RLT.3.A](#)

Determine whether a figure has point symmetry, line symmetry, both, or neither, including

b Determine whether a figure has point symmetry, line symmetry, both, or neither, including figures in context. [G.RLT.3.B](#)

figures in
context. [G.RLT.3.B](#)

Given an image or preimage, identify the transformation or combination of transformations that has/have occurred. Transformations include: [G.RLT.3.C](#)

- i** translations; [G.RLT.3.C.I](#)
 - ii** reflections over any horizontal or vertical line or the lines $y = x$ or $y = -x$; [G.RLT.3.C.II](#)
 - iii** clockwise or counterclockwise rotations of 90° , 180° , 270° , or 360° on a coordinate grid where the center of rotation is limited to the origin; and [G.RLT.3.C.III](#)
 - iv** dilations, from a fixed point on a coordinate grid. [G.RLT.3.C.IV](#)
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Triangles

- TR.1** The student will determine the relationships between the measures of angles and lengths of sides in triangles, including problems in context. [G.TR.1](#)
 - TR.2** The student will, given information in the form of a figure or statement, prove and justify two triangles are congruent using direct and indirect proofs, and solve problems involving measured attributes of congruent triangles. [G.TR.2](#)
 - TR.3** The student will, given information in the form of a figure or statement, prove and justify two triangles are similar using direct and indirect proofs, and solve problems, including those in context, involving measured attributes of similar triangles. [G.TR.3](#)
 - TR.4** The student will model and solve problems, including those in context, involving trigonometry in right triangles and applications of the Pythagorean Theorem. [G.TR.4](#)
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Given the lengths of three segments, determine whether a triangle could be formed. [G.TR.1.A](#)

- a** Given the lengths of three segments, determine whether a triangle could be formed. [G.TR.1.A](#)
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Given the lengths of two sides of a triangle, determine the range in which the length of the third side must lie. [G.TR.1.B](#)

- b** Given the lengths of two sides of a triangle, determine the range in which the length of the third side must lie. [G.TR.1.B](#)
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Order the sides of a triangle by their lengths when given information about the measures of the angles. [G.TR.1.C](#)

- c** Order the sides of a triangle by their lengths when given information about the measures of the angles. [G.TR.1.C](#)
-

Order the angles of a triangle by their measures when given information about the lengths of the sides. [G.TR.1.D](#)

d Order the angles of a triangle by their measures when given information about the lengths of the sides. [G.TR.1.D](#)

Solve for interior and exterior angles of a triangle, when given two angles. [G.TR.1.E](#)

e Solve for interior and exterior angles of a triangle, when given two angles. [G.TR.1.E](#)

Use definitions, postulates, and theorems (including Side-Side-Side (SSS); Side-Angle-Side (SAS); Angle-Side-Angle (ASA); Angle-Angle-Side (AAS); and Hypotenuse-Leg (HL)) to prove and justify two triangles are congruent. [G.TR.2.A](#)

a Use definitions, postulates, and theorems (including Side-Side-Side (SSS); Side-Angle-Side (SAS); Angle-Side-Angle (ASA); Angle-Angle-Side (AAS); and Hypotenuse-Leg (HL)) to prove and justify two triangles are congruent. [G.TR.2.A](#)

Use algebraic methods to prove that two triangles are congruent. [G.TR.2.B](#)

b Use algebraic methods to prove that two triangles are congruent. [G.TR.2.B](#)

Use coordinate methods, such as the slope formula and the distance formula, to prove two triangles are congruent. [G.TR.2.C](#)

c Use coordinate methods, such as the slope formula and the distance formula, to prove two triangles are congruent. [G.TR.2.C](#)

Given a triangle, use congruent segment, congruent angle, and/or perpendicular line constructions to create a congruent triangle (SSS, SAS, ASA, AAS, and HL). [G.TR.2.D](#)

d Given a triangle, use congruent segment, congruent angle, and/or perpendicular line constructions to create a congruent triangle (SSS, SAS, ASA, AAS, and HL). [G.TR.2.D](#)

Use definitions, postulates, and theorems (including Side-Angle-Side (SAS);

a Use definitions, postulates, and theorems (including Side-Angle-Side (SAS); Side-Side-Side (SSS); and Angle-Angle (AA)) to prove and justify that triangles are similar. [G.TR.3.A](#)

Side-Side-Side (SSS);
and Angle-Angle (AA)) to
prove and justify that
triangles are
similar. [G.TR.3.A](#)

Use algebraic methods
to prove that triangles
are similar. [G.TR.3.B](#)

b Use algebraic methods to prove that triangles are similar. [G.TR.3.B](#)

Use coordinate
methods, such as the
slope formula and the
distance formula, to
prove two triangles are
similar. [G.TR.3.C](#)

c Use coordinate methods, such as the slope formula and the distance formula, to
prove two triangles are similar. [G.TR.3.C](#)

Describe a sequence of
transformations that
can be used to verify
similarity of triangles
located in the same
plane. [G.TR.3.D](#)

d Describe a sequence of transformations that can be used to verify similarity of
triangles located in the same plane. [G.TR.3.D](#)

Solve problems,
including those in
context involving
attributes of similar
triangles. [G.TR.3.E](#)

e Solve problems, including those in context involving attributes of similar
triangles. [G.TR.3.E](#)

Determine whether a
triangle formed with
three given lengths is a
right triangle. [G.TR.4.A](#)

a Determine whether a triangle formed with three given lengths is a right
triangle. [G.TR.4.A](#)

Find and verify
trigonometric ratios
using right
triangles. [G.TR.4.B](#)

b Find and verify trigonometric ratios using right triangles. [G.TR.4.B](#)

Model and solve
problems, including
those in context,
involving right triangle
trigonometry (sine,
cosine, and tangent
ratios). [G.TR.4.C](#)

c Model and solve problems, including those in context, involving right triangle
trigonometry (sine, cosine, and tangent ratios). [G.TR.4.C](#)

Solve problems using the properties of special right triangles. **G.TR.4.D**

Solve for missing lengths in geometric figures, using properties of 45° - 45° - 90° triangles, where rationalizing denominators may be necessary. **G.TR.4.E**

Solve for missing lengths in geometric figures, using properties of 30° - 60° - 90° triangles, where rationalizing denominators may be necessary. **G.TR.4.F**

Solve problems, including those in context, involving right triangles using the Pythagorean Theorem and its converse, including recognizing Pythagorean Triples. **G.TR.4.G**

Polygons and Circles

d Solve problems using the properties of special right triangles. **G.TR.4.D**

e Solve for missing lengths in geometric figures, using properties of 45° - 45° - 90° triangles, where rationalizing denominators may be necessary. **G.TR.4.E**

f Solve for missing lengths in geometric figures, using properties of 30° - 60° - 90° triangles, where rationalizing denominators may be necessary. **G.TR.4.F**

g Solve problems, including those in context, involving right triangles using the Pythagorean Theorem and its converse, including recognizing Pythagorean Triples. **G.TR.4.G**

PC.1 The student will prove and justify theorems and properties of quadrilaterals, and verify and use properties of quadrilaterals to solve problems, including the relationships between the sides, angles, and diagonals **G.PC.1**

PC.2 The student will verify relationships and solve problems involving the number of sides and measures of angles of convex polygons. **G.PC.2**

PC.3 The student will solve problems, including those in context, by applying properties of circles. **G.PC.3**

PC.4 The student will solve problems in the coordinate plane involving equations of circles. **G.PC.4**

Solve problems, using the properties specific to parallelograms, rectangles, rhombi, squares, isosceles

a Solve problems, using the properties specific to parallelograms, rectangles, rhombi, squares, isosceles trapezoids, and trapezoids. **G.PC.1.A**

trapezoids, and
trapezoids. [G.PC.1.A](#)

Prove and justify that quadrilaterals have specific properties, using coordinate and algebraic methods, such as the slope formula, the distance formula, and the midpoint formula. [G.PC.1.B](#)

b Prove and justify that quadrilaterals have specific properties, using coordinate and algebraic methods, such as the slope formula, the distance formula, and the midpoint formula. [G.PC.1.B](#)

Prove and justify theorems and properties of quadrilaterals using deductive reasoning. [G.PC.1.C](#)

c Prove and justify theorems and properties of quadrilaterals using deductive reasoning. [G.PC.1.C](#)

Use congruent segment, congruent angle, angle bisector, perpendicular line, and/or parallel line constructions to verify properties of quadrilaterals. [G.PC.1.D](#)

d Use congruent segment, congruent angle, angle bisector, perpendicular line, and/or parallel line constructions to verify properties of quadrilaterals. [G.PC.1.D](#)

Solve problems involving the number of sides of a regular polygon given the measures of the interior and exterior angles of the polygon. [G.PC.2.A](#)

a Solve problems involving the number of sides of a regular polygon given the measures of the interior and exterior angles of the polygon. [G.PC.2.A](#)

Justify the relationship between the sum of the measures of the interior and exterior angles of a convex polygon and solve problems involving the sum of the measures of the angles. [G.PC.2.B](#)

b Justify the relationship between the sum of the measures of the interior and exterior angles of a convex polygon and solve problems involving the sum of the measures of the angles. [G.PC.2.B](#)

Justify the relationship between the measure of each interior and

c Justify the relationship between the measure of each interior and exterior angle of a regular polygon and solve problems involving the measures of the

exterior angle of a regular polygon and solve problems involving the measures of the angles. [G.PC.2.C](#)

angles. [G.PC.2.C](#)

Determine the proportional relationship between the arc length or area of a sector and other parts of a circle. [G.PC.3.A](#)

a Determine the proportional relationship between the arc length or area of a sector and other parts of a circle. [G.PC.3.A](#)

Solve for arc measures and angles in a circle formed by central angles. [G.PC.3.B](#)

b Solve for arc measures and angles in a circle formed by central angles. [G.PC.3.B](#)

Solve for arc measures and angles in a circle involving inscribed angles. [G.PC.3.C](#)

c Solve for arc measures and angles in a circle involving inscribed angles. [G.PC.3.C](#)

Calculate the length of an arc of a circle. [G.PC.3.D](#)

d Calculate the length of an arc of a circle. [G.PC.3.D](#)

Calculate the area of a sector of a circle. [G.PC.3.E](#)

e Calculate the area of a sector of a circle. [G.PC.3.E](#)

Apply arc length or sector area to solve for an unknown measurement of the circle including the radius, diameter, arc measure, central angle, arc length, or sector area. [G.PC.3.F](#)

f Apply arc length or sector area to solve for an unknown measurement of the circle including the radius, diameter, arc measure, central angle, arc length, or sector area. [G.PC.3.F](#)

Derive the equation of a circle of given the center and radius using the Pythagorean Theorem. [G.PC.4.A](#)

a Derive the equation of a circle of given the center and radius using the Pythagorean Theorem. [G.PC.4.A](#)

Solve problems in the coordinate plane involving equations of circles: **G.PC.4.B**

- i** given a graph or the equation of a circle in standard form, identify the coordinates of the center of the circle; **G.PC.4.B.I**
- ii** given the coordinates of the endpoints of a diameter of a circle, determine the coordinates of the center of the circle. **G.PC.4.B.II**
- iii** given a graph or the equation of a circle in standard form, identify the length of the radius or diameter of the circle. **G.PC.4.B.III**
- iv** given the coordinates of the endpoints of the diameter of a circle, determine the length of the radius or diameter of the circle. **G.PC.4.B.IV**
- v** given the coordinates of the center and the coordinates of a point on the circle, determine the length of the radius or diameter of the circle; and **G.PC.4.B.V**
- vi** given the coordinates of the center and length of the radius of a circle, identify the coordinates of a point(s) on the circle. **G.PC.4.B.VI**

Determine the equation of a circle given: **G.PC.4.C**

- i** a graph of a circle with a center with coordinates that are integers; **G.PC.4.C.I**
- ii** coordinates of the center and a point on the circle; **G.PC.4.C.II**
- iii** coordinates of the center and the length of the radius or diameter; and **G.PC.4.C.III**
- iv** coordinates of the endpoints of a diameter. **G.PC.4.C.IV**

Two- and Three-Dimensional Figures

- DF.1** The student will create models and solve problems, including those in context, involving surface area and volume of rectangular and triangular prisms, cylinders, cones, pyramids, and spheres. **G.DF.1**
- DF.2** The student will determine the effect of changing one or more dimensions of a three-dimensional geometric figure and describe the relationship between the original and changed figure. **G.DF.2**

Identify the shape of a two-dimensional cross section of a three-dimensional figure. **G.DF.1.A**

- a** Identify the shape of a two-dimensional cross section of a three-dimensional figure. **G.DF.1.A**

Create models and solve problems, including those in context, involving surface area of three-dimensional figures, as well as composite three-

- b** Create models and solve problems, including those in context, involving surface area of three-dimensional figures, as well as composite three-dimensional figures. **G.DF.1.B**

**dimensional
figures.** [G.DF.1.B](#)

Solve multistep problems, including those in context, involving volume of three-dimensional figures, as well as composite three-dimensional figures. [G.DF.1.C](#)

c Solve multistep problems, including those in context, involving volume of three-dimensional figures, as well as composite three-dimensional figures. [G.DF.1.C](#)

Determine unknown measurements of three-dimensional figures using information such as length of a side, area of a face, or volume. [G.DF.1.D](#)

d Determine unknown measurements of three-dimensional figures using information such as length of a side, area of a face, or volume. [G.DF.1.D](#)

Describe how changes in one or more dimensions of a figure affect other derived measures (perimeter, area, total surface area, and volume) of the figure. [G.DF.2.A](#)

a Describe how changes in one or more dimensions of a figure affect other derived measures (perimeter, area, total surface area, and volume) of the figure. [G.DF.2.A](#)

Describe how changes in surface area and/or volume of a figure affect the measures of one or more dimensions of the figure. [G.DF.2.B](#)

b Describe how changes in surface area and/or volume of a figure affect the measures of one or more dimensions of the figure. [G.DF.2.B](#)

Solve problems, including those in context, involving changing the dimensions or derived measures of a three-dimensional figure. [G.DF.2.C](#)

c Solve problems, including those in context, involving changing the dimensions or derived measures of a three-dimensional figure. [G.DF.2.C](#)

Compare ratios between side lengths, perimeters, areas, and

d Compare ratios between side lengths, perimeters, areas, and volumes of similar figures. [G.DF.2.D](#)

**volumes of similar
figures.** G.DF.2.D

**Recognize when two-
and three-dimensional
figures are similar and
solve problems,
including those in
context, involving
attributes of similar
geometric
figures.** G.DF.2.E

- e Recognize when two- and three-dimensional figures are similar and solve problems, including those in context, involving attributes of similar geometric figures.** G.DF.2.E