

# Geometry

## 2019-2020 Learning Targets

### G1 Constructions

- a) I can copy a line segment and an angle.
- b) I can construct bisecting lines and angles, perpendiculars, parallel lines through a point.
- c) I can construct regular polygons with 3 or more sides.
- d) I can construct the inscribed and circumscribed circles of a triangle to find their incenter and circumcenter, and find the center of gravity.
- e) I can construct a line tangent to a circle from a point outside the given circle.

### G2 Transformations

- a) I can perform transformations including translation, reflection, rotation, dilation, singly and in combination.
- b) I can verify that two figures are congruent or similar using transformations.
- c) I can use coordinate rules to specify a transformation.
- d) I can perform dilations given center and scale factor.
- e) I can verify the properties of dilations given center and scale factor.
- f) I can find and specify a series of translations that map a figure onto another congruent figure.

### G3 Lines & Angles

- a) I can identify angles when given parallel lines and a transversal, and use their relationship to find missing information.
- b) I can use the converse to justify two lines are parallel.
- c) I can identify vertical, complementary, and supplementary angles, and use their relationships to find missing information.
- d) I can find the measure of an angle using the triangle angle sum theorem.

### G4 Congruence and Similarity

- a) I can prove that two triangles are similar or congruent and use this knowledge to map corresponding sides and angles to solve for missing information.
- b) I can produce a proof (flowchart, two-column, or written explanation) with supporting geometric reasoning that two triangles are similar or congruent.

### G5 Trigonometry

- a) I can use sine/cosine/tangent and the Pythagorean Theorem to solve for side lengths and angles of right triangles.
- b) I can use the Law of Sines and the Law of Cosines to solve for sides and angles in non-right triangles.
- d) I can use the formula  $\frac{1}{2}bc\sin A$  to find the area of a triangle without knowing its height.

### G6 Coordinate Geometry

- a) I can draw a quadrilateral given points in the coordinate plane and identify the shape based on its characteristics.
- b) I can identify the slopes of lines and determine whether they are parallel or perpendicular.
- c) I can determine the lengths of sides of polygons to determine if sides are congruent; and use the lengths to find the area and perimeter of polygons (as composite triangles and rectangles).

**G7 Circles**

- a) I can calculate the circumference and area of a circle, and use that knowledge to calculate sector area and arc length.
- b) I can determine the measures of angles and arcs within a circle.
- c) I can use properties of circles and triangles to solve for missing lengths and angles.
- d) I can use the intersecting chord property.
- e) I can derive the equation of a circle of given center and radius using the Pythagorean Theorem; and complete the square to find the center and radius of a circle given by an equation.

**G8 Solids**

- a) I can calculate the volume of a given solid.
- b) I can identify the shape of a two-dimensional cross-section of three-dimensional objects.
- c) I can identify three-dimensional shapes created by rotating two-dimensional shapes.
- d) I can use an informal argument using Cavalieri's principle for the formulas for the volume of a sphere and other solid figures.

**G9 Probability**

- a) I can calculate probabilities with unions and intersections.
- b) I can calculate conditional and independent probabilities.
- c) I can use probability to make informed decisions on the likelihood of events.