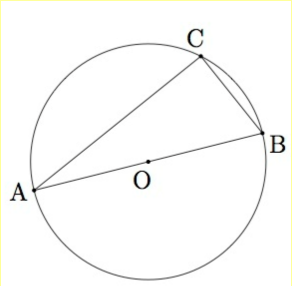
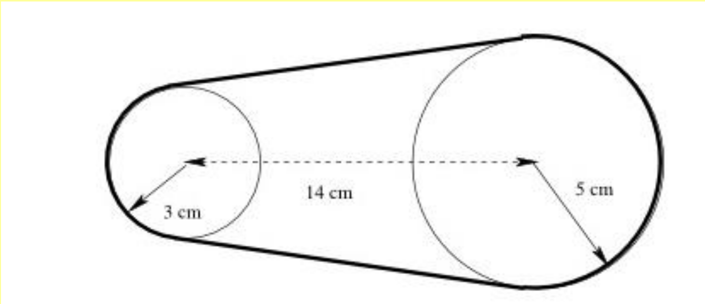
I Can… Geometry

Major Content | Supporting Content | Additional Content

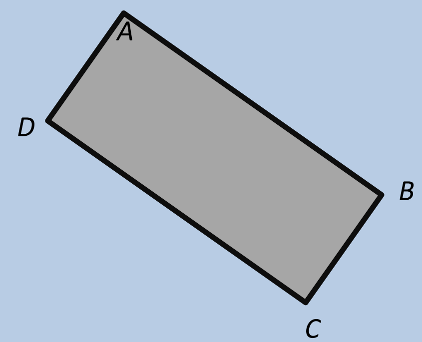
ANNE ARUNDEL COUNTY PUBLIC SCHOOLS

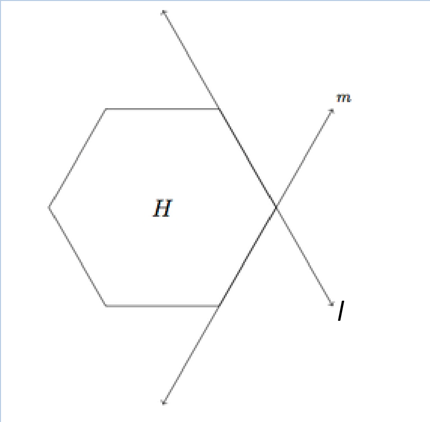
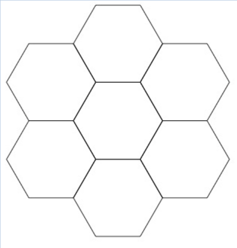
	I Can…	*Example*	I don't yet know it.	I need help from my teacher.	I sometimes need help.	I can do this all by myself.	I can teach this.
Circles	**G-C.2** I can identify and describe relationships among inscribed angles, radii, and chords and apply these concepts in problem solving situations.	Suppose $\overline{AB}$ is a diameter of a circle and *C* is a point on the circle different from *A* and *B* as in the picture.  a. Show that triangles *COB* and *COA* are both isosceles triangles. b. Use part (a) and the fact that the sum of the angles in triangle *ABC* is 180° to show that angle *C* is a right angle. www.illustrativemathematics.com					

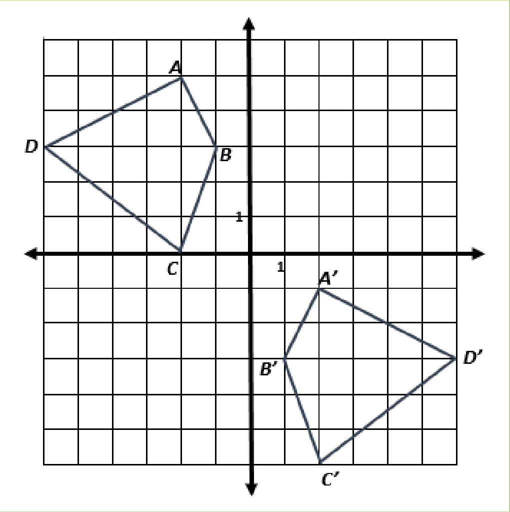
Geometry

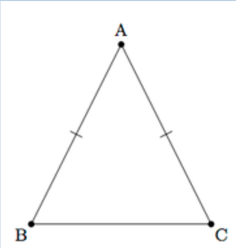
Unit	I Can…	*Example*					
	G-C.B I can find arc lengths and areas of sectors of circles.	A certain machine is to contain two wheels, one of radius 3 centimeters and one of radius 5 cm, whose centers are attached to points 14 cm apart. The manufacturer of this machine needs to produce a belt that will fit snugly around the two wheels, as shown in the diagram below. How long should the belt be?  www.illustrativemathematics.org					

Geometry

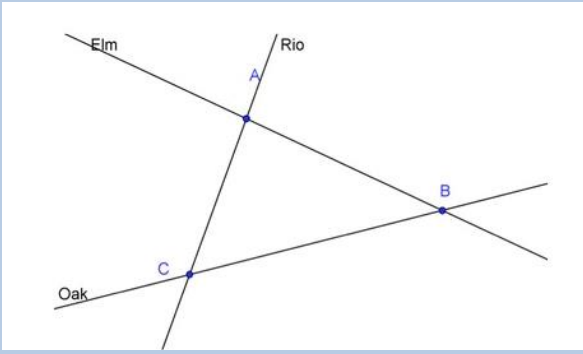
Unit	I Can…	Example					
Congruence	**G-CO.1** I can know precise definitions of angle, circle, perpendicular line, parallel line, and line segment, based on the undefined notions of point, line, distance along a line, and distance around a circular arc.	Alex and his friends are studying for geometry test and one of the main topics covered is parallel lines in a plane. They each write down what they think it means for two distinct lines in a plane to be parallel: **a.** Rachel writes, "Two distinct lines are parallel when they are both perpendicular to a third line." **b.** Alex writes, "Two distinct lines are parallel when they do not meet." **c.** Briana writes, "Two distinct lines are parallel when they have the same slope." Analyze each definition, indicating if it is mathematically correct and if it has any incorrect assumptions. www.illustrativemathematics.org					
	G-CO.3 I can, given a rectangle, parallelogram, trapezoid, or regular polygon, describe the rotations and reflections that carry it onto itself.	Name all rotations and reflections that carry rectangle *ABCD* onto itself.  					

Unit	I Can…	Example					
	G-CO.5 I can, 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.	A picture of a regular hexagon, which is denoted by *H*, and two lines denoted *p* and *m*, each containing one side of the hexagon:  a. Draw *H'*, the reflection of the hexagon about *l.* b. Draw H'', the reflection of the hexagon about line *m*. c. Show that *H* and its reflections about the six lines containing its sides make the following pattern:  www.illustrativemathematics.org					

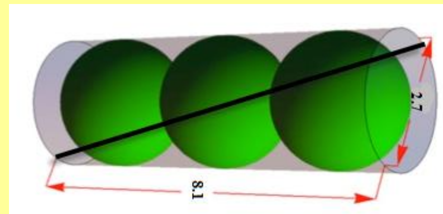
Unit	I Can…	*Example*					
	G-CO.6 I can use geometric descriptions of rigid motions to transform figures and to predict the effect of a given rigid motion on a given figure; given two figures, use the definition of congruence in terms of rigid motions to decide if they are congruent.	Review the transformation graphed:  a. Write a mathematical expression to represent the transformation of *ABCD* → *A'B'C'D'.* b. Explain the relationship between *ABCD* and *A'B'C'D'.*					

Unit	I Can…	*Example*					
	G-CO.C I can prove geometric theorems about lines and angles, triangles, and parallelograms.	The isosceles triangle *ABC* with $\|AB\| = \|AC\|$:  Three students propose different arguments for why $m(\measuredangle B) = m(\measuredangle C)$. a. Ravi says: *If I draw the bisector of* $\measuredangle A$ *then this is a line of symmetry for* ΔABC *and so* $m(\measuredangle B) = m(\measuredangle C)$. b. Brittney says: *If **M** is the midpoint of* $\overline{BC}$ *then* ΔABM *is congruent to* ΔACM *and so* $(\measuredangle B)$ *and* $(\measuredangle C)$ *are congruent.* *c. Courtney says:* *If **P** is a point on* $\overline{BC}$ *such that* $\overleftrightarrow{AP}$ *is perpendicular to* $\overline{BC}$ *then* ΔABP *is congruent to* ΔACP *and so* $(\measuredangle B)$ *and* $(\measuredangle C)$ *are congruent.* www.illustrativemathematics.org					

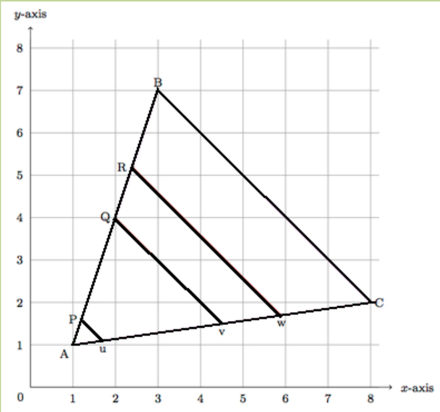
Geometry

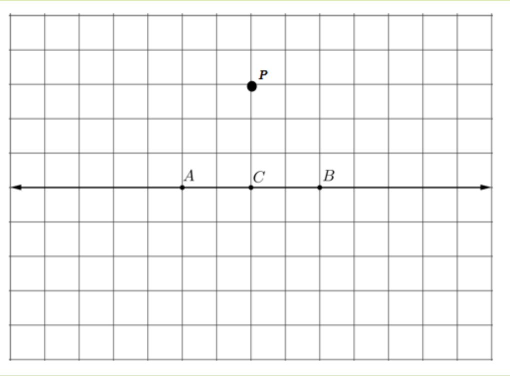
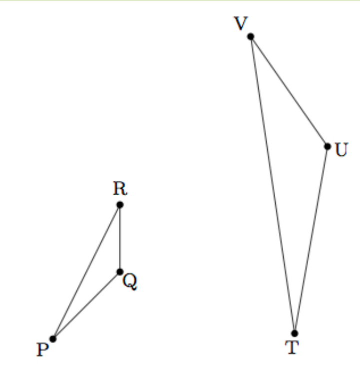
Unit	I Can…	*Example*					
	G-CO.D I can make and understand geometric constructions using a variety of tools and methods. I can construct an equilateral triangle, a square, and a regular hexagon inscribed in a circle.	A company has asked you to place a warehouse so that it is an equal distance from the three roads indicated on the map. Find the location and show your work.  Construction the location of the warehouse. Explain how the construction works, and justify the location of the warehouse is equal distance from the three roads. www.illustrativemathematics.org					

Unit	I Can…	Example					
Geometric Measurement & Dimension	**G-GMD.1** I can give an informal argument for the formulas for the circumference of a circle, area of a circle, volume of a cylinder, pyramid, and cone. Use dissection arguments, Cavalieri's principle, and informal limit arguments.	The four diagonals of a cube with side length *l* meet in a point *P*, and divide the cube into six rectangular pyramids with square bases. a. What is the height and volume of each of these pyramids? b. It seems reasonable to suppose that the volume of a rectangular pyramid is, like a rectangular prism, proportional to its length *l*, width *w*, and height *h*. That is, we expect a formula of the form $V = c(lwh)$ for some constant *c*. Find a constant *c* for which this formula is true for the square pyramid described in the original prompt. c. Does the dissection method described in this problem work to find a formula for the volume of an arbitrary pyramid? Why? www.illustrativemathematics.org					
	G-GMD.3 I can use volume formulas for cylinders, pyramids, cones, and spheres to solve problems.	Three individual square pyramids based on the given measurements: a. The Pyramid of Menkaure has a height of about 215 ft and a base side length of about 339 ft. What is its volume? b. The Pyramid of Khafre has a volume of 74.4 x 10^7 ft^3 and a base side length of 706 ft. What is its height? c. The pyramid of Khufu has a volume of about 86,700,000 ft^3 and a height of 455 feet. What is the length of its base? d. The Great Pyramid of Khufu once stood 26 ft taller than it is today. Calculate the original volume of the Great Pyramid. www.illustrativemathematics.org					

Unit	I Can…	*Example*					
	G-GMD.4 I can identify the shapes of two-dimensional cross-sections of three-dimensional objects, and identify three-dimensional objects generated by rotations of two-dimensional objects.	The diameter of a tennis ball is at least 2.575 inches and at most 2.7 inches. Tennis balls are sold in cylindrical containers that contain three balls each. To model the container and the balls in it, we will assume that the balls are 2.7 in. in diameter and 3x2.7= 8.1 in. high.  a. Lying on its side, the containers passes through an X-ray scanner in an airport. If the material of the container is opaque to X-rays, what outline will appear? b. If the can is cut by a plane parallel to one end of the can- a horizontal plane- what are the possible appearances of the intersections? c. If the can is cut by a plane diagonally from the top base to the opposite side of the bottom base, what is the appearance of the cross sectional? (plane is represented in the graphic.) www.illustrativemathematics.org					

Geometry

Unit	I Can…	Example					
Expressing Geometric Properties with Equations	**G-GPE.1** I can complete the square to find the center and radius of a circle given by an equation, understand or complete a derivation of 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.	Use the Pythagorean theorem to find an equation in *x* and *y* whose solutions are the points on the circle of radius 3 with center (1, -1) and explain why it works.					
	G-GPE.6 I can find the point on a directed line segment between two given points that partitions the segment in a given ratio.	The graph is a picture of ΔABC on the coordinate grid. $\overline{Pu} \parallel \overline{Qv} \parallel \overline{Rw} \parallel \overline{BC}$.  Suppose *P* =(1.2, 1.6), *Q* =(2,4), and *R* =(2.4, 5.2). Find the coordinates of the points *u, v,* and *w*. www.illustrativemathematics.org					

Unit	I Can…	Example					
Similarity, Right Triangles, and Trigonometry	**G-SRT.1** I can verify experimentally the properties of dilations given by a center and a scale factor. 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. I can verify experimentally the properties of dilations given by a center and a scale factor. The dilation of a line segment is longer or shorter in the ratio given by the scale factor.	Apply a diplation by a factor of ¼, centered at the point *P*, to the figure.  Based on your picture, what appears to be the relationship between the distance A'B' and the distance between *AB*? How about the distances *B'C'* and *BC.*					
	G-SRT.2 I can, given two figures, use the definition of similarity in terms of similarity transformations to decide if they are similar.	Two triangles which share three congruent angles: $m(\angle P) = m(\angle T), m(\angle Q) = m(\angle U), m(\angle R) = m(\angle V)$  Show that, after applying a suitable dilation, $\Delta PQR \cong \Delta TUV$. www.illustrativemathematics.org					

Geometry

Unit	I Can…	*Example*					
	G-SRT.5 I can use congruence and similarity criteria for triangles to solve problems and to prove relationships in geometric figures.	Right triangles *ABC* and *DEF* have right angles at *B* and *F*. If $\overline{AC} \cong \overline{FD}$, is it possible the $\Delta ABC \cong \Delta DEF$? Use mathematics to justify your conclusions.					
	G-SRT.7 I can use the relationship between the sine and cosine of complementary angles.	The Morris family is on a road trip through California. One day they are driving from Death Valley to Sequoia National Park. Death Valley is home to the lowest point in the US at Badwater Basin with 282 ft below sea level. Sequoia National Park is home to Ms. Whitney, the highest point in the lower 48 states with 14,505 ft. Jerry is estimating form the map that the two places are only 85 miles apart as the crow flies. He is wondering: If you hike to the top of Mt. Whitney, can you see Badwater Basin on a clear day? Find an answer to Jerry's question and support it with an appropriate mathematical model. www.illustrativemathematics.org					
	G-SRT.8 I can use trigonometric ratios and the Pythagorean Theorem to solve right triangles in applied problems.	A man is lying on the beach, flying a kite. He holds the end of the kite string at ground level and estimates the angle of elevation of the kite to be 50 °. If the string is 450 feet long, how high is the kite above the ground?					

Geometry

Unit	I Can…	*Example*					
	G-Int.1 I can solve multi-step contextual word problems with degree of difficulty appropriate to the course, requiring application of course-level knowledge and skills articulated in applying geometric concepts through models and communicating the use coordinate geometry and models to solve for perimeter, areas, and distances for varied geometric figures.	Amy and Greg look for a method to estimate the number of leaves on a 35 foot tree in their yard. Greg notices that the tree blocks almost all of the sunlight beneath its leaves so he thinks of the following way to estimate how many leaves are on the tree: • We can first measure the area of the ground covered by the tree. • Then we measure the area of an average leaf. • We will need to estimate how much of its area an average leaf shades and how many leaves lie over an average point under the tree. With all of this information we should be able to get a good estimate for the number of leaves on the tree. a. Amy and Greg find that the tree covers a region which is roughly a circle 30 feet in diameter. What is the approximate area covered by the tree? b. How can Amy and Greg effectively measure an irregular shape such as a tree leaf? c. How can Amy and Greg effectively decide what number to multiply by to account for multiple leaves lying over the same area and leaves shading less than their full surface area? www.illustrativemathematics.org					