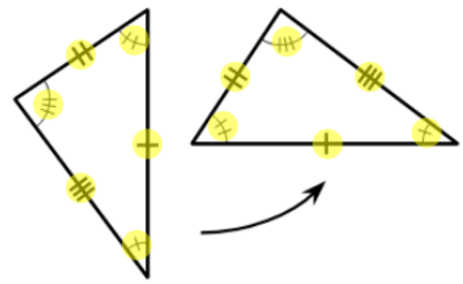
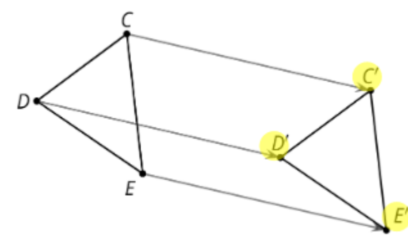
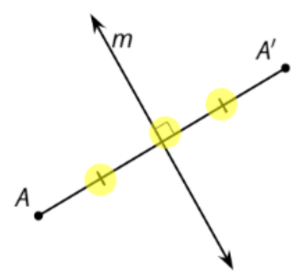
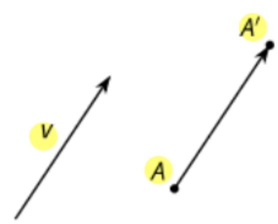
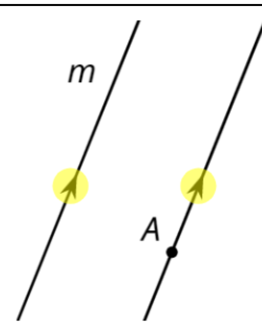
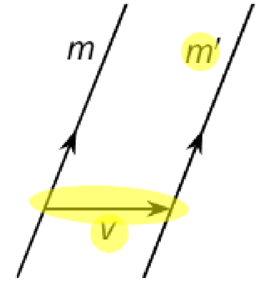
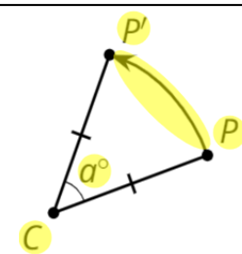
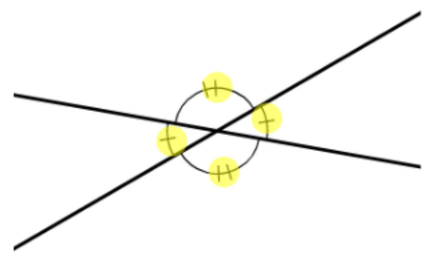
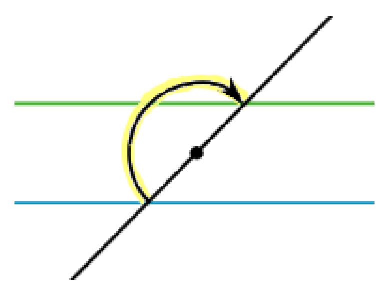
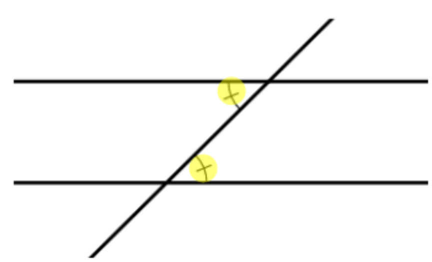
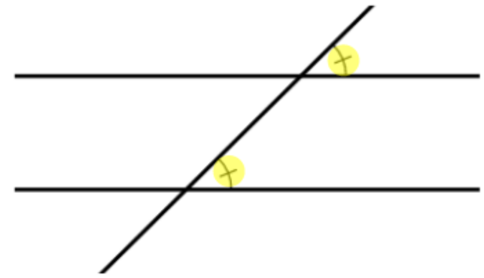
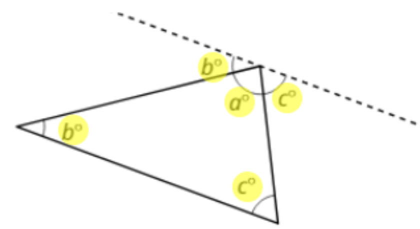
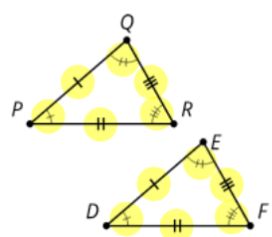
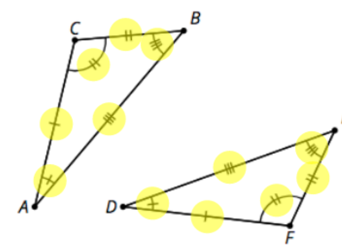
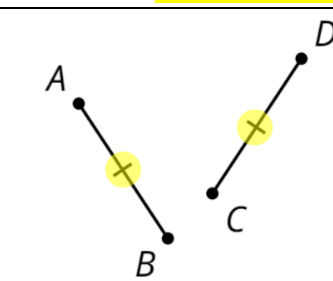
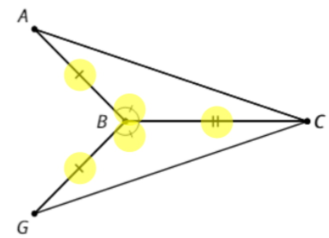
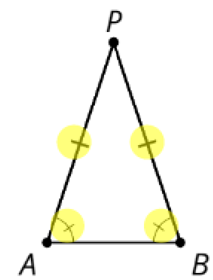
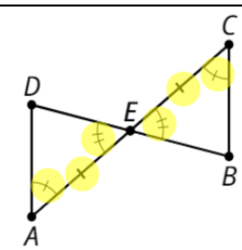
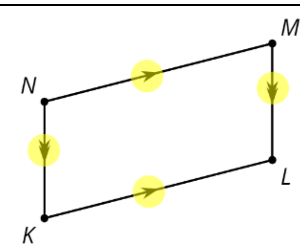
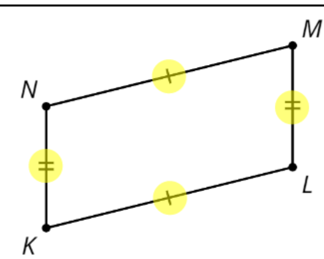
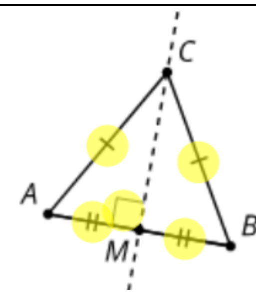
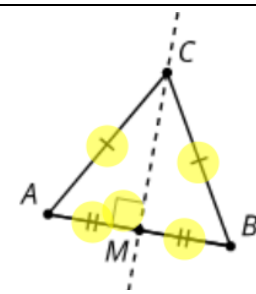
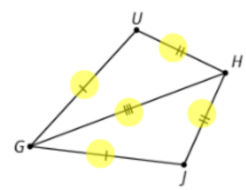
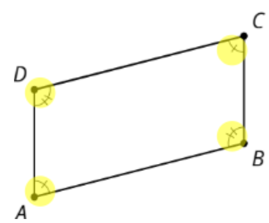
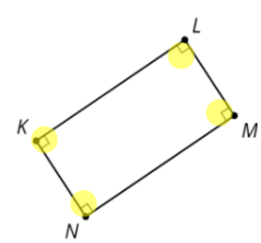
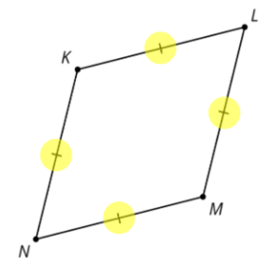
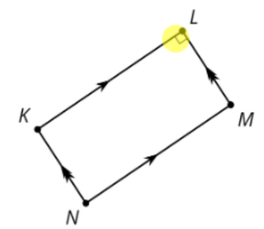
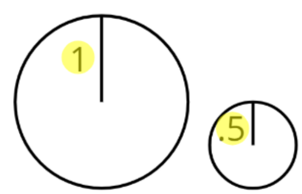
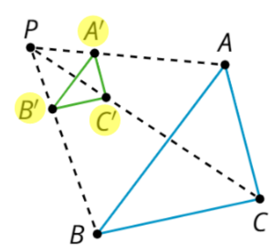
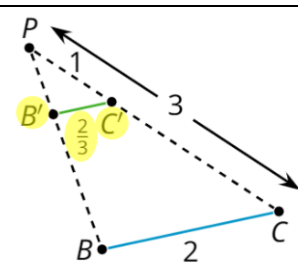
lesson, type	statement	diagram
U1, L10 (students write the date) assertion	A **rigid transformation** is a translation, reflection, rotation, or any sequence of the three. Rigid transformations take lines to lines, angles to angles of the same measure, and segments to segments of the same length.	
U1, L10 definition	One figure is **congruent** to another if there is a sequence of translations, rotations, and reflections that takes the first figure exactly onto the second figure. The second figure is called the image of the rigid transformation.	 $\triangle EDC \cong \triangle E'D'C'$
U1, L11 definition	**Reflection** is a rigid transformation that takes a point to another point that is the same distance from the given line, is on the other side of the given line, and so that the segment from the original point to the image is perpendicular to the given line. Reflect _(object)_ across line _(name)_.	 Reflect *A* across line *m*.
U1, L12 definition	**Translation** is a rigid transformation that takes a point to another point so that the directed line segment from the original point to the image is parallel to the given line segment and has the same length and direction. Translate _(object)_ by the directed line segment _(name or from [point] to [point])_.	 Translate *A* by the directed line segment *v*.
U1, L12 assertion	**Parallel Postulate:** Given a line *m* and a point *A* that is not on *m*, there is exactly one line that goes through *A* that is parallel to *m*.	

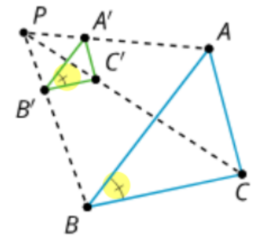
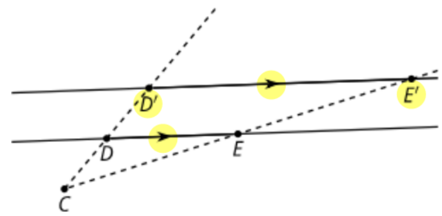
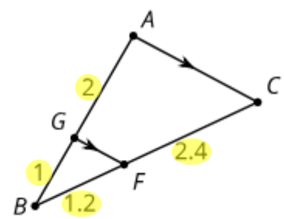
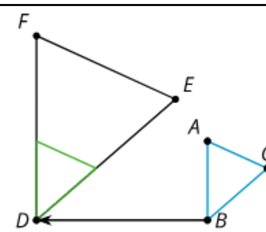
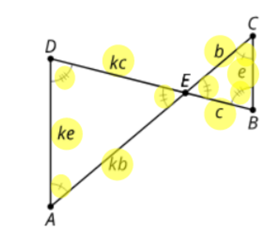
lesson, type	statement	diagram
U1, L12 theorem	Translations take lines to parallel lines or to themselves.	 $m \parallel m'$
U1, L14 definition	**Rotation** is a rigid transformation that takes a point to another point on the circle through the original point with the given center. The two radii to the original point and the image make the given angle. Rotate _(object)_ (clockwise or counterclockwise) by _(angle or angle measure)_ using center _(point)_.	 Rotate *P* counterclockwise by *a*° using center *C*.
U1, L19 theorem	Vertical angles are congruent.	
U1, L20 assertion	Rotation by 180 degrees takes lines to parallel lines or to themselves.	
U1, L20 theorem	**Alternate Interior Angle Theorem:** If two parallel lines are cut by a transversal, then alternate interior angles are congruent. Conversely, if two lines are cut by a transversal and alternate interior angles are congruent, then the lines have to be parallel.	

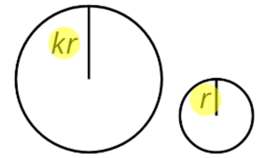
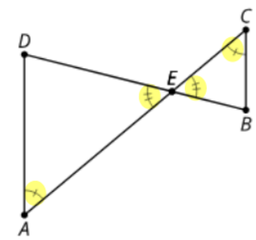
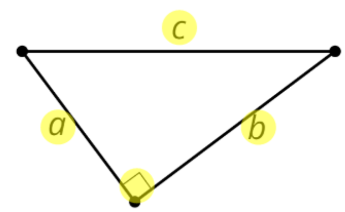
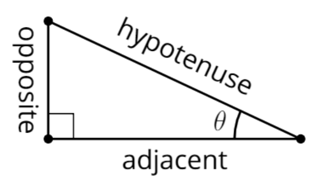
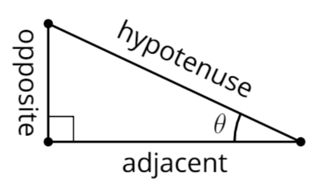
lesson, type	statement	diagram
U1, L20 theorem	**Corresponding Angle Theorem:** If two parallel lines are cut by a transversal, then corresponding angles are congruent. Conversely, if two lines are cut by a transversal and corresponding angles are congruent, then the lines have to be parallel.	
U1, L21 theorem	**Triangle Angle Sum Theorem:** The three angle measures of any triangle always sum to 180 degrees.	 $a+b+c=180$
U2, L1 theorem	If two figures are congruent, then **corresponding** parts of those figures must be congruent	 $\triangle PQR \cong \triangle DEF$ so $PQ=DE$, $PR=DF$, $QR=EF$, $\angle P \cong \angle D$, $\angle Q \cong \angle E$, $\angle R \cong \angle F$
U2, L3 theorem	If all pairs of corresponding sides and all pairs of corresponding angles are congruent, then the triangles must be congruent.	 $AB=DE$, $BC=EF$, $CA=FD$, $\angle B \cong \angle E$, $\angle A \cong \angle D$, $\angle C \cong \angle F$ so $\triangle ABC \cong \triangle DEF$
U2, L5 theorem	If two segments have the same length, then they are congruent.	 $AB = CD$ so, $\overline{AB} \cong \overline{CD}$

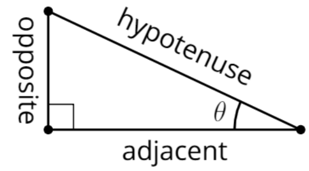
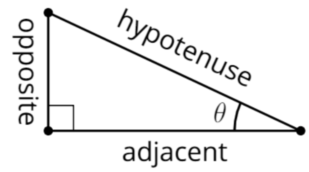
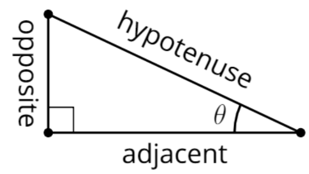
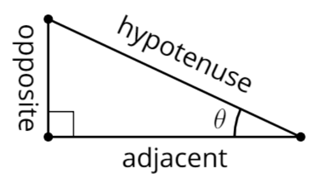
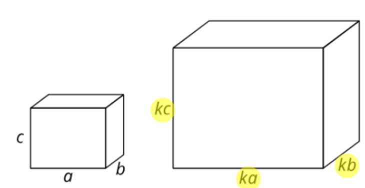
lesson, type	statement	diagram
U2, L6 theorem	**Side-Angle-Side Triangle Congruence Theorem:** In two triangles, if two pairs of congruent corresponding sides and the pair of corresponding angles between the sides are congruent, then the two triangles are congruent.	 $AB=GB$, $BC=BC$, $\angle ABC \cong \angle GBC$ so $\triangle ABC \cong \triangle GBC$
U2, L6 theorem	**Isosceles Triangle Theorem:** In an isosceles triangle, the base angles are congruent.	 $AP=PB$ so $\angle A \cong \angle B$
U2, L7 theorem	**Angle-Side-Angle Triangle Congruence Theorem:** In two triangles, if two pairs of corresponding angles, and the pair of corresponding sides between the angles are congruent, then the triangles must be congruent.	 $\angle A \cong \angle C$, $AE=EC$, $\angle DEA \cong \angle BEC$, so $\triangle DEA \cong \triangle BEC$
U2, L7 definition	A **parallelogram** is a quadrilateral with two pairs of opposite sides parallel.	 $NM \parallel KL$, $NK \parallel ML$, so $MNKL$ is a parallelogram
U2, L7 theorem	In a parallelogram, pairs of opposite sides are congruent.	 $MNKL$ is a parallelogram, so $NM=KL$, $NK=ML$

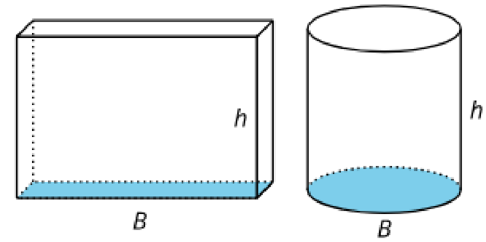
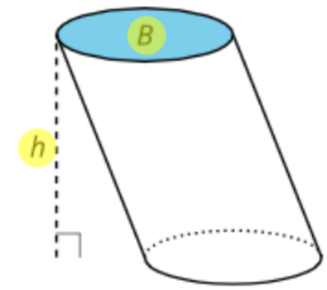
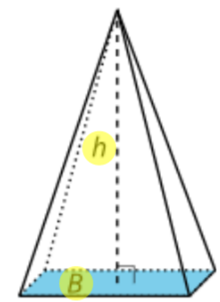
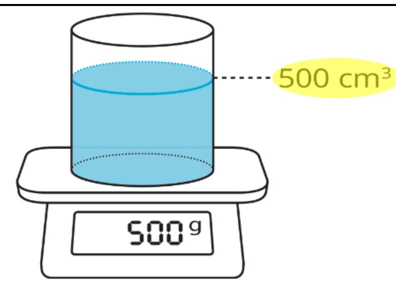
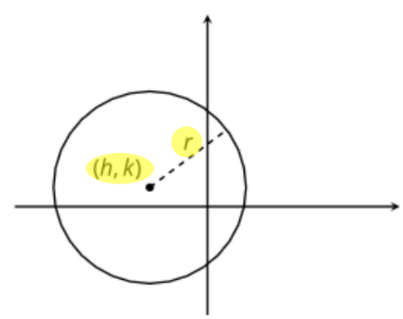
lesson, type	statement	diagram
U2, L8 theorem	If a point C is the same distance from A as it is from B, then C must be on the perpendicular bisector of AB.	 $AC=BC$, M is the midpoint, so $MC \perp AB$
U2, L8 theorem	If C is a point on the perpendicular bisector of segment AB, the distance from C to A is the same as the distance from C to B.	 $AB \perp CM$, $AM=BM$, so $AC=BC$
U2, L9 theorem	**Side-Side-Side Triangle Congruence Theorem:** In two triangles, if all three pairs of corresponding sides are congruent, then the triangles must be congruent.	 $HU=HJ$, $UG=JG$, $HG=HG$ so $\triangle HUG \cong \triangle HJG$
U2, L9 theorem	In a parallelogram, opposite angles are congruent.	 $ABCD$ is a parallelogram, so $\angle A \cong \angle C$, $\angle D \cong \angle B$
U2, L12 definition	A **rectangle** is a quadrilateral with four right angles.	

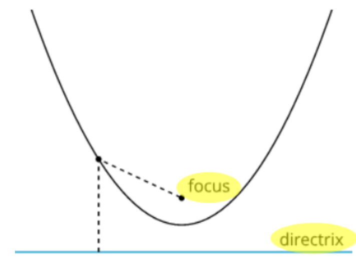
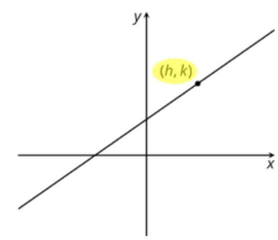
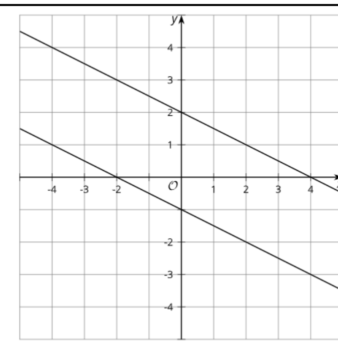
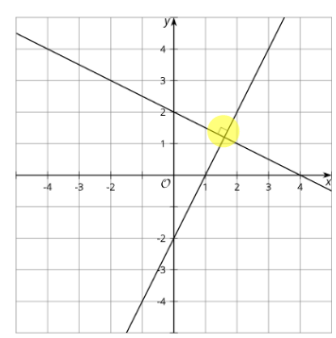
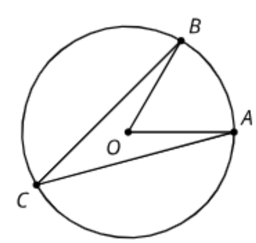
lesson, type	statement	diagram
U2, L12 definition	A **rhombus** is a quadrilateral with four congruent sides.	
U2, L12 theorem	If a parallelogram has (at least) one right angle, then it is a rectangle.	 *KLMN* has a right angle so it is a rectangle
U3, L1 definition	**Scale factor** is the factor by which every length in an original figure is multiplied when you make a scaled copy.	 Scale factor is 2 or ½
U3, L1 definition	A **dilation** with center *P* and positive scale factor *k* takes a point *A* along the ray *PA* to another point whose distance is *k* times further away from *P* than *A* is. Dilate _(object)_ using center _(point)_ and a scale factor of _(number)_.	 $PA' = k \cdot PA$
U3, L3 assertion	The dilation of a line segment is longer or shorter according to the same ratio given by the scale factor.	 $PC{:}PC' = 3{:}1$, $BC{:}B'C' = 2{:}\frac{2}{3}$

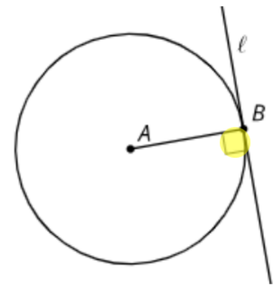
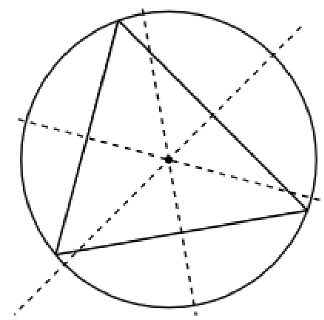
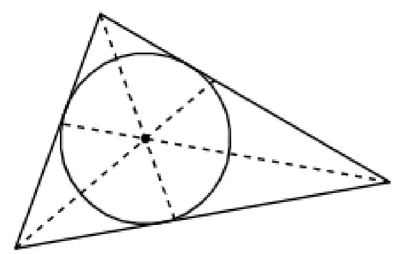
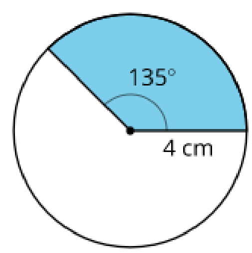
lesson, type	statement	diagram
U3, L4 assertion	If a figure is dilated, then corresponding angles are congruent.	 $\triangle A'B'C'$ is a dilation of $\triangle ABC$ so $\angle B \cong \angle B'$
U3, L4 theorem	A dilation takes a line not passing through the center of the dilation to a parallel line, and leaves a line passing through the center unchanged.	 Dilate using center C. $DE \parallel D'E'$
U3, L5 theorem	If a line divides two sides of a triangle proportionally, the line must be parallel to the third side of the triangle.	 $\frac{1}{2} = \frac{1.2}{2.4}$ so $AC \parallel GF$
U3, L6 definition	One figure is **similar** to another if there is a sequence of rigid motions and dilations that takes the first figure so that it fits exactly over the second.	 Translation and dilation takes $\triangle ABC$ onto $\triangle DEF$ so $\triangle ABC \sim \triangle DEF$
U3, L7 theorem	If two triangles have all pairs of corresponding angles congruent and all pairs of corresponding side lengths in the same proportion, then the two triangles are similar.	 $\angle A \cong \angle C$, $\angle D \cong \angle B$, $\angle DEA \cong \angle BEC$, $\frac{AD}{CB} = \frac{DE}{BE} = \frac{EA}{EC}$ so $\triangle DEA \sim \triangle BEC$

lesson, type	statement	diagram
U3, L8 theorem	All circles are similar.	
U3, L9 theorem	**Angle-Angle Triangle Similarity Theorem:** In two triangles, if two pairs of corresponding angles are congruent, then the triangles must be similar.	 $\angle A \cong \angle C$, $\angle DEA \cong \angle BEC$, so $\triangle DEA \sim \triangle BEC$
U3, L14 theorem	**Pythagorean Theorem:** If a right triangle has legs with lengths a and b and hypotenuse with length c, then $a^2 + b^2 = c^2$.	 $a^2 + b^2 = c^2$
U4, L6 definition	The **cosine** of an acute angle in a right triangle is the ratio (quotient) of the length of the adjacent leg to the length of the hypotenuse.	 $\cos(\theta) = \frac{\text{adjacent}}{\text{hypotenuse}}$
U4, L6 definition	The **sine** of an acute angle in a right triangle is the ratio (quotient) of the length of the opposite leg to the length of the hypotenuse.	 $\sin(\theta) = \frac{\text{opposite}}{\text{hypotenuse}}$

lesson, type	statement	diagram
U4, L6 definition	The **tangent** of an acute angle in a right triangle is the ratio (quotient) of the length of the opposite leg to the length of the adjacent leg.	 $\tan(\theta) = \frac{\text{opposite}}{\text{adjacent}}$
U4, L9 definition	The **arccosine** of a number between 0 and 1 is the acute angle whose cosine is that number.	 $\arccos\left(\frac{\text{adjacent}}{\text{hypotenuse}}\right) = \theta$
U4, L9 definition	The **arcsine** of a number between 0 and 1 is the acute angle whose sine is that number.	 $\arcsin\left(\frac{\text{opposite}}{\text{hypotenuse}}\right) = \theta$
U4, L9 definition	The **arctangent** of a positive number is the acute angle whose tangent is that number.	 $\arctan\left(\frac{\text{opposite}}{\text{adjacent}}\right) = \theta$
U5, L6 theorem	When any solid is dilated using a scale factor of k, all lengths are multiplied by k, all areas are multiplied by k^2, and all volumes are multiplied by k^3.	

lesson, type	statement	diagram
U5, L10 theorem	**Cavalieri's Principle**: If two solids are cut into cross sections by parallel planes, and the corresponding cross sections on each plane always have equal areas, then the two solids have the same volume.	
U5, L10 theorem	A prism or cylinder whose base has area B square units and whose height is h units has volume $V = Bh$ cubic units, regardless of the shape of the base or whether the solid is oblique.	
U5, L13 theorem	A pyramid or cone whose base has area B square units and whose height is h units has volume $V = \frac{1}{3} Bh$ cubic units, regardless of the shape of the base or whether the solid is oblique.	
U5, L17 definition	The **density** of a substance is the mass of the substance per unit volume. $$\text{density} = \frac{\text{mass}}{\text{volume}}$$	 density = 1 g per cm^3
U6, L4 theorem	A circle with center (h, k) and radius r has equation $(x - h)^2 + (y - k)^2 = r^2$.	

lesson, type	**statement**	**diagram**
U6, L7 definition	A **parabola** is the set of points that are equidistant from a given point, called the *focus*, and a given line, called the *directrix*.	
U6, L9 definition	The **point-slope form** of the equation of a line is $y - k = m(x - h)$ where (h, k) is a particular point on the line and m is the slope of the line.	
U6, L10 theorem	Lines are parallel if and only if they have equal slopes.	
U6, L11 theorem	Lines are perpendicular if and only if their slopes are opposite reciprocals.	
U7, L2 assertion	**Inscribed Angle Theorem:** The measure of an inscribed angle is half the measure of the central angle that defines the same arc.	 $m\angle BCA = \frac{1}{2}m\angle BOA$

lesson, type	statement	diagram
U7, L3 theorem	A line is tangent to a circle if and only if it is perpendicular to the radius drawn to the point of tangency.	
U7, L5 theorem	The 3 perpendicular bisectors of the sides of a triangle meet at a single point, called the triangle's **circumcenter**. This point is the center of the triangle's circumscribed circle.	
U7, L7 theorem	The 3 angle bisectors of a triangle meet at a single point, called the triangle's **incenter**. This point is the center of the triangle's inscribed circle.	
U7, L8 theorem	To calculate the area of a sector or the length of an arc, first find the fraction of the circle represented by the central angle of the arc or sector. Multiply this fraction by the circle's area or circumference.	 arc length: 3π cm sector area: 6π cm^2
U7, L11 definition	For any angle, imagine drawing a circle with the angle's vertex at its center. Then, the **radian** measure of the angle is the ratio of the length of the arc defined by the angle to the circle's radius. That is, $\theta = \frac{arc\ length}{radius}$.