FSA Geometry End-of-Course Review Packet

Circles Geometric Measurement and Geometric Properties

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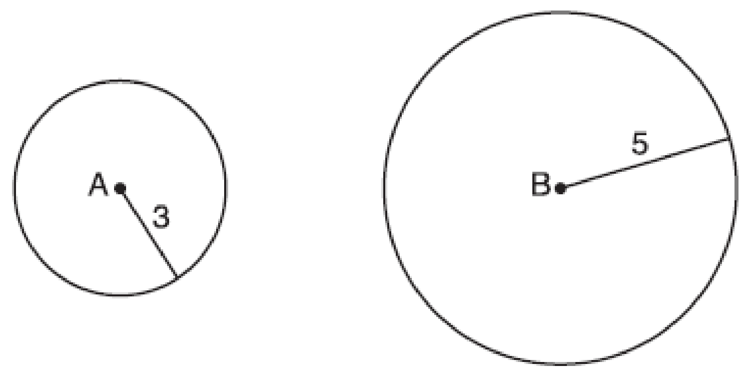
MAFS.912.G-C.1.1 EOC Practice

Level 2	Level 3	Level 4	Level 5
identifies that all circles are similar	uses a sequence of no more than two transformations to prove that two circles are similar	uses the measures of different parts of a circle to determine similarity	explains why all circles are similar

1. As shown in the diagram below, circle A as a radius of 3 and circle B has a radius of 5.

   Use transformations to explain why circles A and B are similar.



2. Which can be accomplished using a sequence of similarity transformations?

   I. mapping circle O onto circle P so that O_1 matches P_1

   II. mapping circle P onto circle O so that P_1 matches O_1

   A. I only
   B. II only
   C. both I and II
   D. neither I nor II

3. Which statement explains why all circles are similar?

   A. There are 360° in every circle.
   B. The ratio of the circumference of a circle to its diameter is same for every circle.
   C. The diameter of every circle is proportional to the radius.
   D. The inscribed angle in every circle is proportional to the central angle.

4. Which method is valid for proving that two circles are similar?

   A. Calculate the ratio of degrees to the area for each circle and show that they are equal.
   B. Calculate the ratio of degrees to the radius for each circle and show that they are equal.
   C. Calculate the ratio of the area to the diameter for each circle and show that they are equal.
   D. Calculate the ratio of radius to circumference for each circle and show that they are equal.

5. Which statement is true for any two circles?

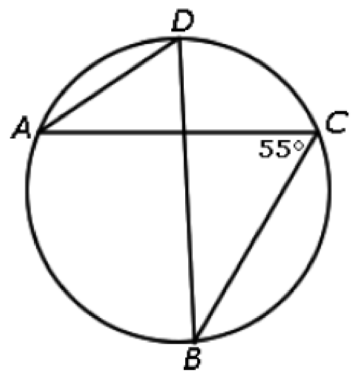
   A. The ratio of the areas of the circles is the same as the ratio of their radii.
   B. The ratio of the circumferences of the circles is the same as the ratio of their radii.
   C. The ratio of the areas of the circles is the same as the ratio of their diameters.
   D. The ratio of the areas of the circles is the same as the ratio of their circumferences.

FSA Geometry EOC Review

MAFS.912.G-C.1.2 EOC Practice

Level 2	Level 3	Level 4	Level 5
solves problems using the properties of central angles, diameters, and radii	solves problems that use no more than two properties including using the properties of inscribed angles, circumscribed angles, and chords	solves problems that use no more than two properties, including using the properties of tangents	solves problems using at least three properties of central angles, diameters, radii, inscribed angles, circumscribed angles, chords, and tangents

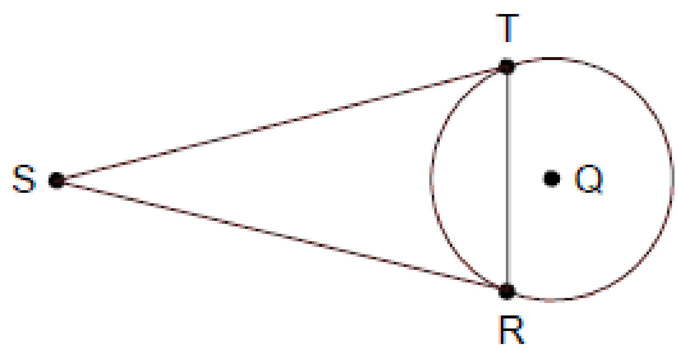
1. If $m\angle C = 55°$, then what is $m\angle D$?



A. 27.5°
B. 35°
C. 55°
D. 110°

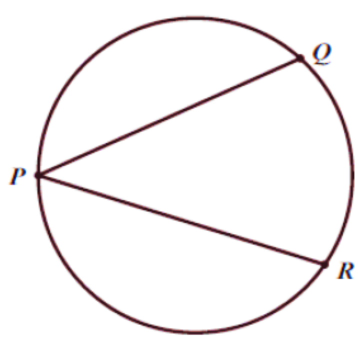
2. Triangle STR is drawn such that segment ST is tangent to circle Q at point T, and segment SR is tangent to circle Q at point R. If given any triangle STR with these conditions, which statement must be true?

A. Side TR could pass through point Q.
B. Angle S is always smaller than angles T and R.
C. Triangle STR is always an isosceles triangle.
D. Triangle STR can never be a right triangle.



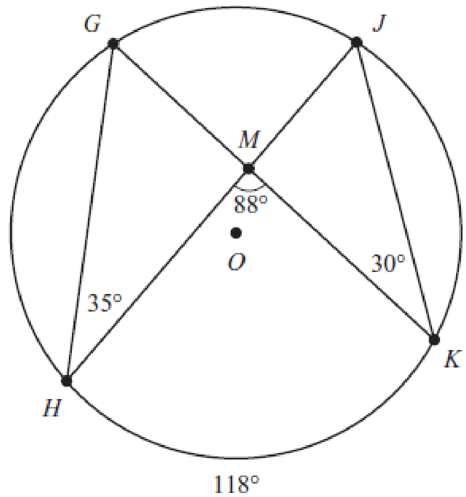
3. In this circle, $\boldsymbol{mQR} = \mathbf{72°}$.

What is m∠QPR?



A. 18°
B. 24°
C. 36°
D. 72°

4. Use the diagram to the right to answer the question.



What is wrong with the information given in the diagram?

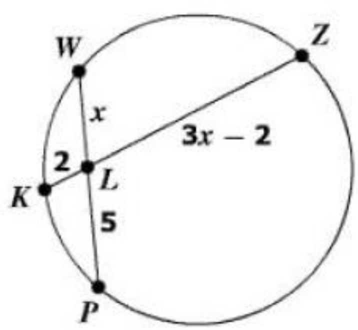
A. $\overline{HJ}$ should pass through the center of the circle.

B. The length of $\overline{GH}$ should be equal to the length of $\overline{JK}$.

C. The measure of $\angle GHM$ should be equal to the measure of $\angle JKM$.

D. The measure of $\angle HMK$ should be equal to half the measure of HK

5. Chords $\overline{WP}$ and $\overline{KZ}$ intersect at point L in the circle shown.



What is the length of $\overline{KZ}$?

A. 7.5

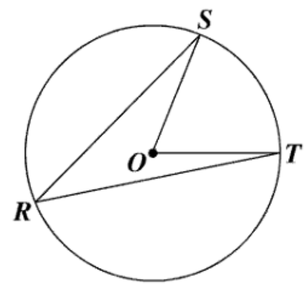
B. 9

C. 10

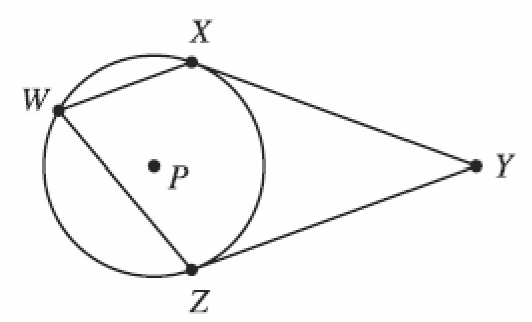
D. 12

6. In circle O, $m\angle SOT = 68°$. What is $m\angle SRT$?

$m\angle SRT =$ ☐



7. Circle P has tangents $\overline{XY}$ and $\overline{ZY}$ and chords $\overline{WX}$ and $\overline{WZ}$, as shown in this figure. The measure of $\angle ZWX = 70°$.



What is the measure, in degrees, of $\angle XYZ$?

A. 20°
B. 35°
C. 40°
D. 55°

MAFS.912.G-C.1.3 EOC Practice

Level 2	Level 3	Level 4	Level 5
identifies inscribed and circumscribed circles of a triangle	creates or provides steps for the construction of the inscribed and circumscribed circles of a triangle; uses properties of angles for a quadrilateral inscribed in a circle; chooses a property of angles for a quadrilateral inscribed in a circle within an informal argument	solves problems that use the incenter and circumcenter of a triangle; justifies properties of angles of a quadrilateral that is inscribed in a circle; proves properties of angles for a quadrilateral inscribed in a circle	proves the unique relationships between the angles of a triangle or quadrilateral inscribed in a circle

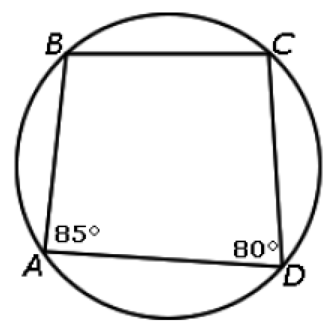
1. The center of the inscribed circle of a triangle has been established. Which point on one of the sides of a triangle should be chosen to set the width of the compass?

   A. intersection of the side and the median to that side
   B. intersection of the side and the angle bisector of the opposite angle
   C. intersection of the side and the perpendicular passing through the center
   D. intersection of the side and the altitude dropped from the opposite vertex

2. Quadrilateral ABCD is inscribed in a circle as shown in the diagram below.

   If $m\angle A = 85°$ and $m\angle D = 80°$, what is the $m\angle B$?

   A. 80°
   B. 85°
   C. 95°
   D. 100°



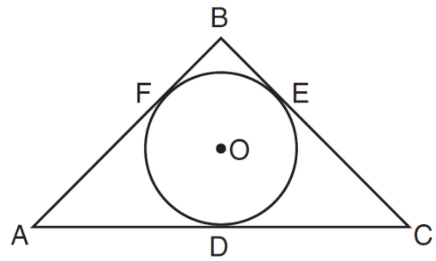
3. Quadrilateral ABCD is inscribed in a circle. Segments AB and BC are not the same length. Segment AC is a diameter. Which must be true?

   A. ABCD is a trapezoid.
   B. ABCD is a rectangle.
   C. ABCD has at least two right angles.
   D. ABCD has an axis of symmetry.

4. Which statement is valid when a circumscribed circle of an obtuse triangle is constructed?

   A. The longest side of the triangle lies on the diameter of the circle.
   B. The circle is drawn inside the triangle touching all 3 sides.
   C. The center of the circle is in the interior of the triangle.
   D. The vertices of the triangle lie on the circle.

5. In the diagram below, $\overline{AB}, \overline{BC}$, and $\overline{AC}$ are tangents to circle O at points F, E, and D, respectively, $AF = 6, CD = 5$, and $BE = 4$.



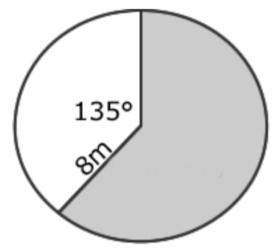
What is the perimeter of ΔABC?

A. 15
B. 25
C. 30
D. 60

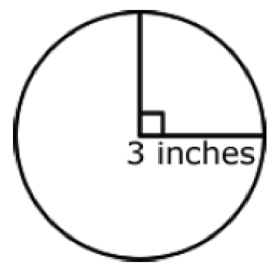
MAFS.912.G-C.2.5 EOC Practice

Level 2	Level 3	Level 4	Level 5
identifies a sector area of a circle as a proportion of the entire circle	applies similarity to solve problems that involve the length of the arc intercepted by an angle and the radius of a circle; defines radian measure as the constant of proportionality	derives the formula for the area of a sector and uses the formula to solve problems; derives, using similarity, the fact that the length of the arc intercepted by an angle is proportional to the radius	proves that the length of the arc intercepted by an angle is proportional to the radius, with the radian measure of the angle being the constant of proportionality

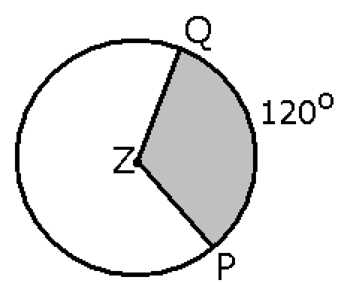
1. What is the area of the shaded sector?
   A. 5π square meters
   B. 10π square meters
   C. 24π square meters
   D. 40π square meters



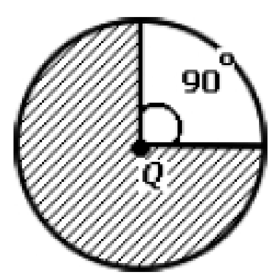
2. What is the area of the 90° sector?
   A. $\frac{3\pi}{4}$ square inches
   B. $\frac{3\pi}{2}$ square inches
   C. $\frac{9\pi}{4}$ square inches
   D. $\frac{9\pi}{2}$ square inches



3. What is the area of the shaded sector if the radius of circle Z is 5 inches?
   A. $\frac{25\pi}{3}$ square inches
   B. 25π square inches
   C. $\frac{25\pi}{4}$ square inches
   D. 5π square inches

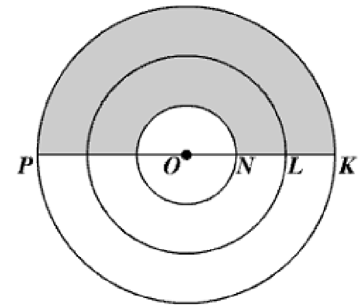


4. What is the area of the shaded sector, given circle Q has a diameter of 10?
   A. $18\frac{3}{4}\pi$ square units
   B. 25π square units
   C. $56\frac{1}{4}\pi$ square units
   D. 75π square units



5. Given: Three concentric circles with the center O.

   $\overline{KL} \cong \overline{LN} \cong \overline{NO}$
   $KP = 42\ inches$



   Which is closest to the area of the shaded region?

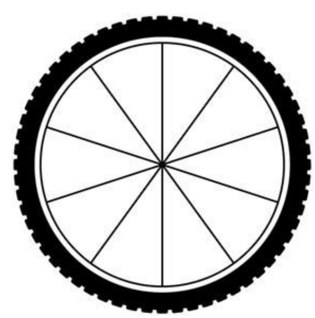
   A. $231\ sq\ in.$
   B. $308\ sq\ in.$
   C. $539\ sq\ in.$
   D. $616\ sq\ in.$

6. The minute hand on a clock is 10 centimeters long and travels through an arc of $108°$ every 18 minutes.

   Which measure is closest to the length of the arc the minute hand travels through during this 18 –minute period?

   A. $3\ cm$
   B. $6\ cm$
   C. $9.4\ cm$
   D. $18.8\ cm$

7. The spokes of a bicycle wheel form 10 congruent central angles. The diameter of the circle formed by the outer edge of the wheel is 18 inches.

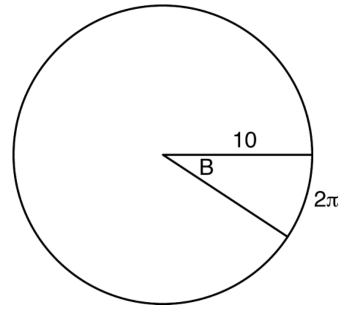


   What is the length, to the nearest 0.1 inch, of the outer edge of the wheel between two consecutive spokes?

   A. 1.8 inches
   B. 5.7 inches
   C. 11.3 inches
   D. 25.4 inches

8. In the diagram below, the circle shown has radius 10. Angle B intercepts an arc with a length of 2π.

What is the measure of angle B, in radians?



A. $10 + 2\pi$

B. 20π

C. $\frac{\pi}{5}$

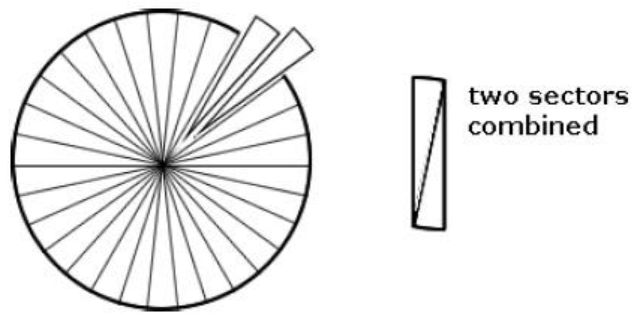
D. $\frac{5}{\pi}$

FSA Geometry EOC Review

MAFS.912.G-GMD.1.1 EOC Practice

Level 2	Level 3	Level 4	Level 5
gives an informal argument for the formulas for the circumference of a circle and area of a circle	uses dissection arguments and Cavalier's principle for volume of a cylinder, pyramid, and cone	sequences an informal limit argument for the circumference of a circle, area of a circle, volume of a cylinder, pyramid, and cone	explains how to derive a formula using an informal argument

1. To estimate the area of a circle, Irene divided the circle into 30 congruent sectors. Then she combined pairs of sectors into shapes as shown below. As the shapes resemble rectangles, she treats the shapes as rectangles with the height r (radius) and the base equal to the length of the curved side of one sector. What is the area of each shape?



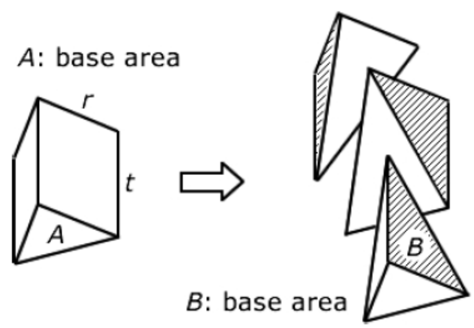
A. $r\frac{nr}{15}$

B. $r\frac{nr}{30}$

C. $r\frac{nr}{60}$

D. $r\frac{nr}{120}$

2. The prism can be cut into three pyramids with the shaded faces congruent. If the shaded faces are considered as bases, then all three pyramids have the same height, h. Therefore the pyramids have equal volumes. What is the volume of each pyramid?



A. $\frac{1}{3}Bt$

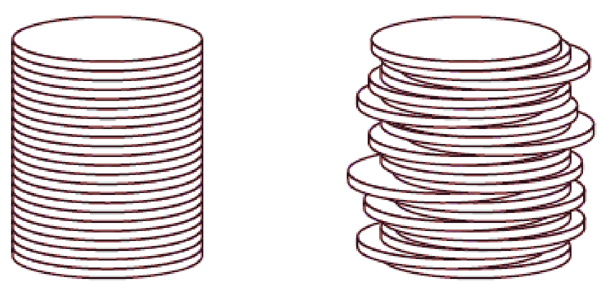
B. $\frac{1}{3}Ah$

C. $\frac{1}{3}Ar$

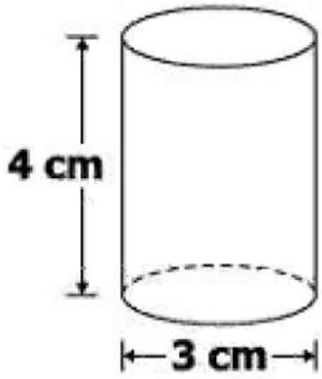
D. $\frac{1}{3}At$

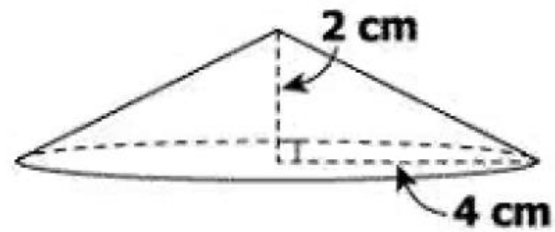
3. Two stacks of 23 quarters each are shown below. One stack forms a cylinder but the other stack does not form a cylinder.

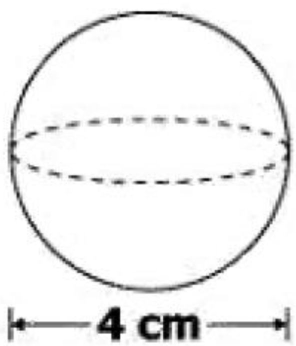
Use Cavelieri's principle to explain why the volumes of these two stacks of quarters are equal.

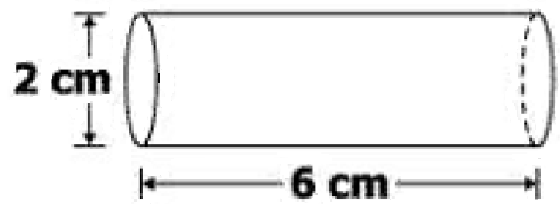


4. Two cylinders, a sphere, and a cone are shown. Select the two objects with the same volume.





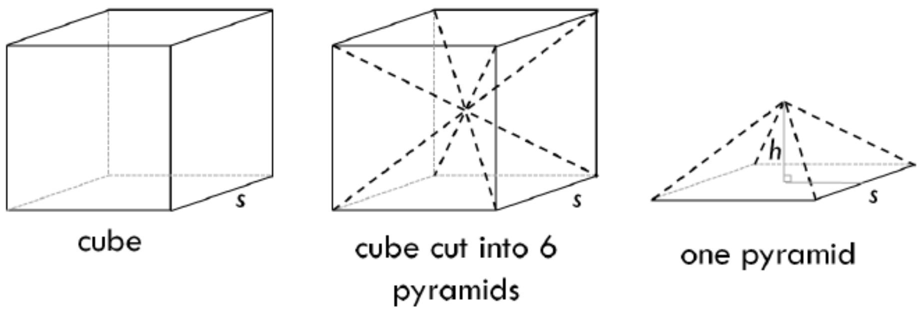




5. According to Cavalieri's principle, under what conditions are the volumes of two solids equal?

   A. When the cross-sectional areas are the same at every level
   B. When the areas of the bases are equal and the heights are equal
   C. When the cross-sectional areas are the same at every level and the heights are equal
   D. When the bases are congruent and the heights are equal

6. Sasha derived the formula for the volume of a square pyramid. She started by dividing a cube into 6 identical square pyramids. The top vertex of each pyramid meets at the central point in the cube, with the cube's diagonals as the edges.



$$V = \text{the volume of a pyramid};\ s = \text{side length of base},\ h = \text{height of pyramid}$$

The steps of Sasha's work are shown.

- Step 1: $\boldsymbol{6V = s^3}$
- Step 2: $\boldsymbol{V = \frac{1}{3}s^3}$

Maggie also derived the formula for volume of a square pyramid.

- Maggie's result is $\boldsymbol{V = \frac{1}{3}s^2h}$.

The formulas derived by Sasha and Maggie can both be used to correctly calculate the volume of a square pyramid. What are the best next steps for Sasha to take to prove that either formula can be used to find the volume of a square pyramid?

A.

step 3	$2h = s$
step 4	$V = \frac{1}{6}(2h)^3$
step 5	$V = \frac{1}{3}8h^3$

B.

step 3	$2h = s$
step 4	$V = \frac{1}{6}s^2(s)$
step 5	$V = \frac{1}{6}s^2(2h)$

C.

step 3	$2s = h$
step 4	$s = \frac{1}{2}h$
step 5	$V = \frac{1}{6}s^2(s)$
step 6	$V = \frac{1}{6}s^2\left(\frac{1}{2}h\right)$

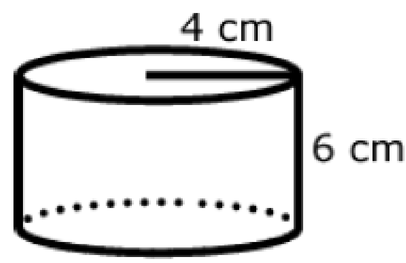
D.

step 3	$2s = h$
step 4	$s = \frac{1}{2}h$
step 5	$V = \frac{1}{6}\left(\frac{1}{2}h\right)^3$
step 6	$V = \frac{1}{6}\left(\frac{1}{8}\right)h^3$

MAFS.912.G-GMD.1.3 EOC Practice

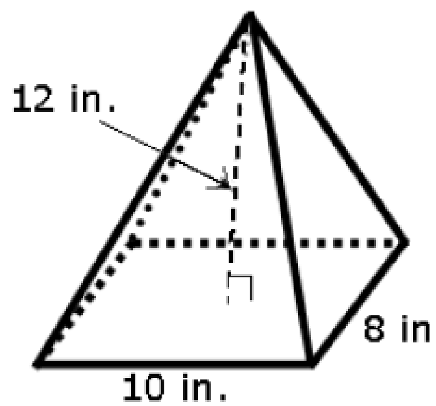
Level 2	Level 3	Level 4	Level 5
substitutes given dimensions into the formulas for the volume of cylinders, pyramids, cones, and spheres, given a graphic, in a real-world context	finds a dimension, when given a graphic and the volume for cylinders, pyramids, cones, or spheres	solves problems involving the volume of composite figures that include a cube or prism, and a cylinder, pyramid, cone, or sphere (a graphic would be given); finds the volume when one or more dimensions are changed	finds the volume of composite figures with no graphic; finds a dimension when the volume is changed

1. Find the volume of the cylinder.



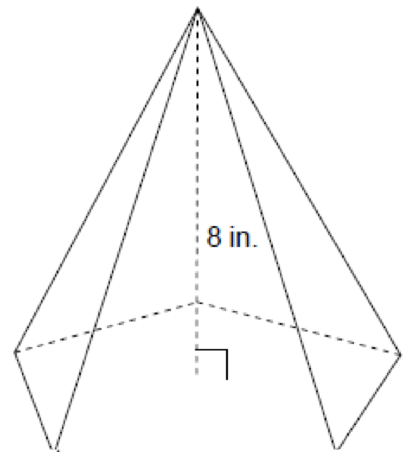
A. 452.2 cubic cm
B. 301.4 cubic cm
C. 150.7 cubic cm
D. 75.4 cubic cm

2. Find the volume of the rectangular pyramid.



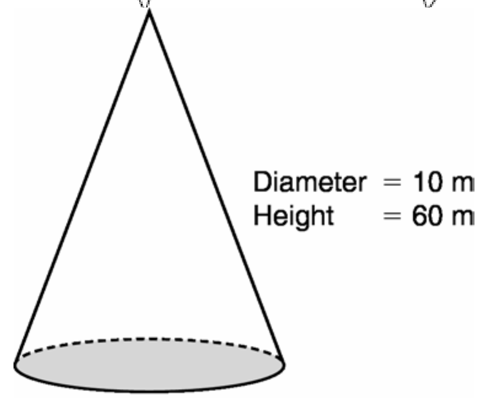
A. 72 cubic inches
B. 200 cubic inches
C. 320 cubic inches
D. 960 cubic inches

3. This right pentagonal pyramid has a height of 8 inches and a base area of 61.94 square inches. To the nearest hundredth, what is the volume of the pyramid?



A. 80.00 cubic inches
B. 165.17 cubic inches
C. 240.00 cubic inches
D. 495.52 cubic inches

4. What is the volume of the cone shown?



(Not drawn to scale)

A. $500\pi\ m^3$
B. $1{,}500\pi\ m^3$
C. $2{,}000\pi\ m^3$
D. $3{,}000\pi\ m^3$

5. A cylinder has a volume of 300π cubic centimeters and a base with a circumference of 10π centimeters. What is the height of the cylinder?

A. 30 cm
B. 15 cm
C. 12 cm
D. 3 cm

6. The ratio of the volume of two spheres is 8:27. What is the ratio of the lengths of the radii of these two spheres?

☐ : ☐

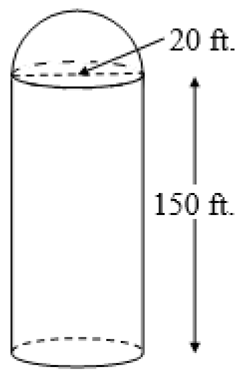
7. The height of a cylinder is 9.5 centimeters. The diameter of this cylinder is 1.5 centimeters longer than the height. Which is closest to the volume of the cylinder?

A. $1{,}150\pi$
B. 287π
C. 165π
D. 105π

8. The diameter of a basketball is approximately 9.5 inches and the diameter of a tennis ball is approximately 2.5 inches. The volume of the basketball is about how many times greater than the volume of the tennis ball?

   A. 3591
   B. 65
   C. 55
   D. 4

9. A grain storage silo consists of a cylinder and a hemisphere. The diameter of the cylinder and the hemisphere is 20 feet. The cylinder is 150 feet tall.



   What is the volume of the silo?

   A. $\frac{17000\pi}{3}\ ft^3$
   B. $\frac{47000\pi}{3}\ ft^3$
   C. $\frac{49000\pi}{3}\ ft^3$
   D. $\frac{182000\pi}{3}\ ft^3$

MAFS.912.G-GMD.2.4 EOC Practice

Level 2	Level 3	Level 4	Level 5
identifies the shapes of two-dimensional cross- sections formed by a vertical or horizontal plane	identifies a three-dimensional object generated by rotations of a triangular and rectangular object about a line of symmetry of the object; identifies the location of a horizontal or vertical slice that would give a particular cross-section; draws the shape of a particular two-dimensional cross-section that is the result of horizontal or vertical slice of a three-dimensional shape	identifies a three-dimensional object generated by rotations of a closed two-dimensional object about a line of symmetry of the object; identifies the location of a nonhorizontal or nonvertical slice that would give a particular cross-section; draws the shape of a particular two-dimensional cross-section that is the result of a nonhorizontal or nonvertical slice of a three-dimensional shape; compares and contrasts different types of slices	identifies a three-dimensional object generated by rotations, about a line of symmetry, of an open two-dimensional object or a closed two-dimensional object with empty space between the object and the line of symmetry; compares and contrasts different types of rotations

1. An isosceles right triangle is placed on a coordinate grid. One of its legs is on the x-axis and the other on the y-axis. Which describes the shape created when the triangle is rotated about the $x - axis$?

   A. Cone
   B. Cylinder
   C. Pyramid
   D. Sphere

2. A rectangle will be rotated 360° about a line which contains the point of intersection of its diagonals and is parallel to a side. What three-dimensional shape will be created as a result of the rotation?

   A. Cube
   B. Rectangular Prism
   C. Cylinder
   D. a sphere

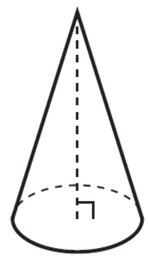
3. Which of the following figures could be produced by translating a polygon back and forth in a direction perpendicular to the plane containing the figure?

   A. Cone
   B. Cylinder
   C. Prism
   D. Sphere

4. Which of the following is the best description for the resulting three-dimensional figure if a right triangle is rotated about the line containing its hypotenuse?

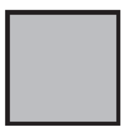
   A. a cone with slant height the same length as the longest leg
   B. a pyramid with triangular base
   C. two cones sharing the same circular base with apexes opposite each other
   D. a cone with slant height the same length as the shortest leg

5. William is drawing pictures of cross sections of the right circular cone below.

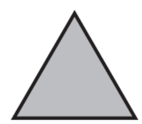


Which drawing cannot be a cross section of a cone?

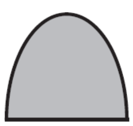
A.



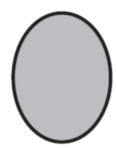
B.



C.

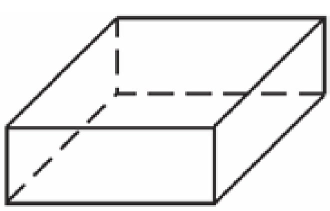


D.

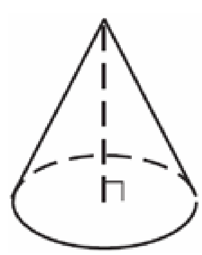


6. Which figure can have the same cross section as a sphere?

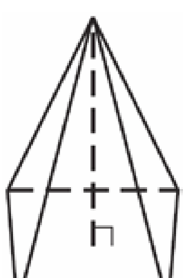
A.



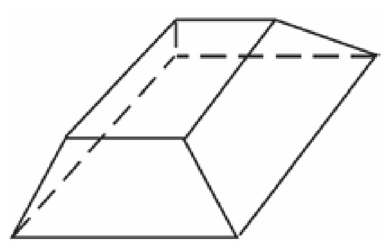
B.



C.



D.



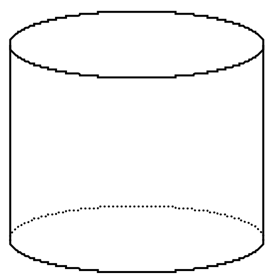
7. If the rectangle below is continuously rotated about side w, which solid figure is formed?

A. pyramid
B. rectangular prism
C. cone
D. cylinder

8. What shape is the cross section formed by the intersection of a cone and a plan parallel to the base of the cone?

A. Circle
B. trapezoid
C. oval
D. triangle

9. Andrea claims that any two cross sections of a cylinder that lie on parallel planes are congruent.



Is Andrea correct? If not, how can she modify her claim to be correct?

A. No; any two cross sections of a cylinder that lie on planes parallel to the bases of the cylinder are congruent.
B. No; any two cross sections of a cylinder that lie on planes parallel to a plane containing the axis of rotation are congruent.
C. No; any two cross sections of a cylinder that lie on planes containing the axis of rotation are congruent.
D. Andrea is correct.

10. Erin drew a three-dimensional figure with an intersecting plane to show a circular cross section. She then noticed that all cross sections parallel to the one she drew would also be circles. What additional information would allow you to conclude that Erin's figure was a cylinder?

A. The centers of the circular cross sections lie on a line.
B. The circular cross sections are congruent.
C. The circular cross sections are similar but not congruent.
D. The figure also has at least one rectangular cross section.

MAFS.912.G-GPE.1.1 EOC Practice

Level 2	Level 3	Level 4	Level 5
determines the center and radius of a circle given its equation in general form	completes the square to find the center and radius of a circle given by its equation; derives the equation of a circle using the Pythagorean theorem, the coordinates of a circle's center, and the circle's radius	derives the equation of the circle using the Pythagorean theorem when given coordinates of a circle's center and a point on the circle	derives the equation of a circle using the Pythagorean theorem when given coordinates of a circle's center as variables and the circle's radius as a variable

1. A circle has this equation.

$$x^2 + y^2 + 4x - 10y = 7$$

What are the center and radius of the circle?

A. center: (2, –5)
radius: 6
B. center: (–2, 5)
radius: 6
C. center: (2, –5)
radius: 36
D. center: (–2, 5)
radius: 36

2. The equation $x^2 + y^2 - 4x + 2y = b$ describes a circle.

Part A
Determine they-coordinate of the center of the circle. Enter your answer in the box.

Part B
The radius of the circle is 7 units. What is the value of b in the equation? Enter your answer in the box.

3. What is the radius of the circle described by the equation $(x - 2)^2 + (y + 3)^2 = 25$?

A. 4
B. 5
C. 25
D. 625

4. What is the equation of a circle with radius 3 and center $(3, 0)$?

   A. $x^2 + y^2 - 6x = 0$
   B. $x^2 + y^2 + 6x = 0$
   C. $x^2 + y^2 - 6x + 6 = 0$
   D. $x^2 + y^2 - 6y + 6 = 0$

5. Given: Circle W

   $W(-4, 6)$
   $Radius\ =\ 10\ units$
   Which point lies on circle W?

   A. $A(0, 4)$
   B. $B(2, 10)$
   C. $C(4, 0)$
   D. $D(6, 16)$

6. The equation $(x-1)^2 + (y-3)^2 = r^2$ represents circle A. The point $B(4, 7)$ lies on the circle. What is r, the length of the radius of circle A?

   A. $\sqrt{13}$
   B. 5
   C. $5\sqrt{5}$
   D. $\sqrt{137}$

7. Which is the equation of a circle that passes through $(2, 2)$ and is centered at $(5, 6)$?

   A. $(x-6)^2 + (y-5)^2 = 25$
   B. $(x-5)^2 + (y-6)^2 = 5$
   C. $(x+5)^2 + (y+6)^2 = 25$
   D. $(x-5)^2 + (y-6)^2 = 25$

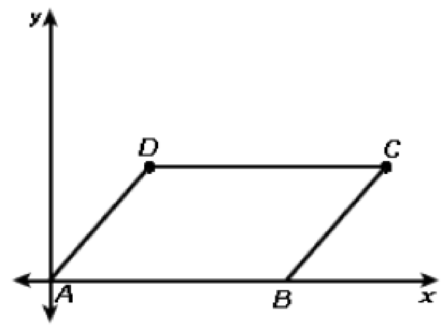
8. Which is the equation of a circle that has a diameter with endpoints $(1, 3)$ and $(-3, 1)$?

   A. $(x+1)^2 + (y-2)^2 = 10$
   B. $(x+1)^2 + (y-2)^2 = 20$
   C. $(x+1)^2 + (y-2)^2 = 5$
   D. $(x-1)^2 + (y-2)^2 = 5$

MAFS.912.G-GPE.2.4 EOC Practice

Level 2	Level 3	Level 4	Level 5
uses coordinates to prove or disprove that a figure is a parallelogram	uses coordinates to prove or disprove that a figure is a square, right triangle, or rectangle; uses coordinates to prove or disprove properties of triangles, properties of circles, properties of quadrilaterals when given a graph	uses coordinates to prove or disprove properties of triangles, properties of circles, properties of quadrilaterals without a graph; provide an informal argument to prove or disprove properties of triangles, properties of circles, properties of quadrilaterals; uses coordinates to prove or disprove properties of regular polygons when given a graph	completes an algebraic proof or writes an explanation to prove or disprove simple geometric theorems

1. The diagram shows quadrilateral ABCD.



Which of the following would prove that ABCD is a parallelogram?

A. Slope of $\overline{AD}$ = Slope of $\overline{BC}$
   Length of $\overline{AD}$ = Length of $\overline{BC}$
B. Slope of $\overline{AD}$ = Slope of $\overline{BC}$
   Length of $\overline{AB}$ = Length of $\overline{AD}$
C. Length of $\overline{AD}$ = Length of $\overline{BC}$ = Length of $\overline{DC}$
D. Length of $\overline{AD}$ = Length of $\overline{BC}$ = Length of $\overline{AB}$

2. Given the coordinates of A(3, 6), B(5, 2), and C(9, 4), which coordinates for D make ABCD a square?

A. (6, 7)
B. (7, 8)
C. (7, 9)
D. (8, 7)

3. Jillian and Tammy are considering a quadrilateral $ABCD$. Their task is to prove is a square.
   - Jillian says, "We just need to show that the slope of $\overline{AB}$ equals the slope of $\overline{CD}$ and the slope of $\overline{BC}$ equals the slope $\overline{AD}$."
   - Tammy says, "We should show that $AC = BD$ and that $(slope\ of\ \overline{AC}) \times (slope\ of\ \overline{BD}) = -1$."

Whose method of proof is valid?

A. Only Jillian's is valid.
B. Only Tammy's is valid.
C. Both are valid.
D. Neither is valid.

4. Which type of triangle has vertices at the points $R(2,1)$, $S\ (2,5)$, and $T(4,1)$?

   A. right
   B. acute
   C. isosceles
   D. equilateral

5. The vertices of a quadrilateral are $M(-1,1)$, $N(1,-2)$, $O(5,0)$, and $P(3,3)$. Which statement describes Quadrilateral MNOP?

   A. Quadrilateral MNOP is a rectangle.
   B. Quadrilateral MNOP is a trapezoid.
   C. Quadrilateral MNOP is a rhombus but not a square.
   D. Quadrilateral MNOP is a parallelogram but not a rectangle.

6. Triangle ABC has vertices with $A(x,3)$, $B(-3,-1)$, and $C(-1,-4)$. Determine and state a value of x that would make triangle a right triangle.

MAFS.912.G-GPE.2.5 EOC Practice

Level 2	Level 3	Level 4	Level 5
identifies that the slopes of parallel lines are equal	creates the equation of a line that is parallel given a point on the line and an equation, in slope-intercept form, of the parallel line or given two points (coordinates are integral) on the line that is parallel; creates the equation of a line that is perpendicular given a point on the line and an equation of a line, in slope- intercept form	creates the equation of a line that is parallel given a point on the line and an equation, in a form other than slope-intercept; creates the equation of a line that is perpendicular that passes through a specific point when given two points or an equation in a form other than slope-intercept	proves the slope criteria for parallel and perpendicular lines; writes equations of parallel or perpendicular lines when the coordinates are written using variables or the slope and y-intercept for the given line contains a variable

1. Which statement is true about the two lines whose equations are given below?

$$3x - 5y = -3$$

$$-2x + y = -8$$

   A. The lines are perpendicular.
   B. The lines are parallel.
   C. The lines coincide.
   D. The lines intersect, but are not perpendicular.

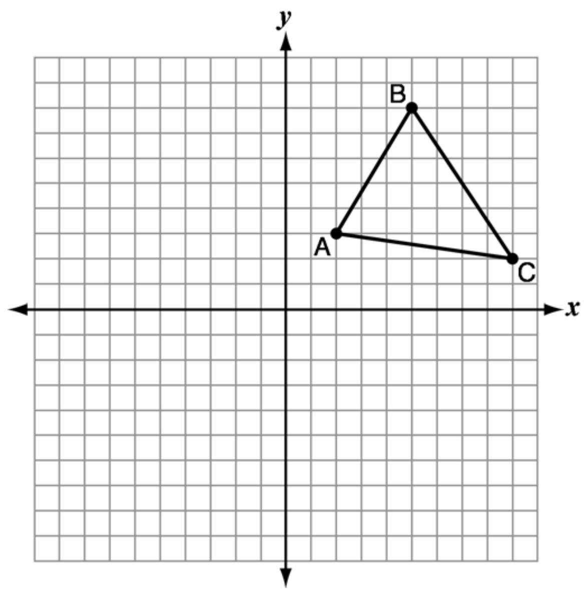
2. An equation of a line perpendicular to the line represented by the equation $y = -\frac{1}{2}x - 5$ and passing through $(6, -4)$ is

   A. $y = -\frac{1}{2}x + 4$
   B. $y = -\frac{1}{2}x - 1$
   C. $y = 2x + 14$
   D. $y = 2x - 16$

3. The equation of a line containing one leg of a right triangle is $y = -4x$. Which of the following equations could represent the line containing the other leg of this triangle?

   A. $y = -\frac{1}{4}x$
   B. $y = \frac{1}{4}x + 2$
   C. $y = 4x$
   D. $y = -4x + 2$

4. ΔABC with vertices $A(2,3), B(5,8)$, and $C(9,2)$ is graphed on the coordinate plane below.



Which equation represents the altitude of ΔABC from vertex B?

A. $y = -11x + 55$
B. $y = -11x + 63$
C. $y = 7x - 36$
D. $y = 7x - 27$

5. Which equation describes a line that passes through $(6, -8)$ and is perpendicular to the line described by $4x - 2y = 6$?

A. $y = -\frac{1}{2}x - 5$
B. $y = -\frac{1}{2}x - 3$
C. $y = 2x - 3$
D. $y = 2x - 20$

6. Write an equation in point-slope form for the perpendicular bisector of the segment with endpoints $A(-2, 2)$ and $B(5, 4)$.

A. $y - 3 = -\frac{7}{2}(x - 1.5)$
B. $y - 3 = \frac{2}{3}(x - 1.5)$
C. $y - 1 = -\frac{2}{7}(x - 3.5)$
D. $y - 1 = \frac{7}{2}(x - 3.5)$

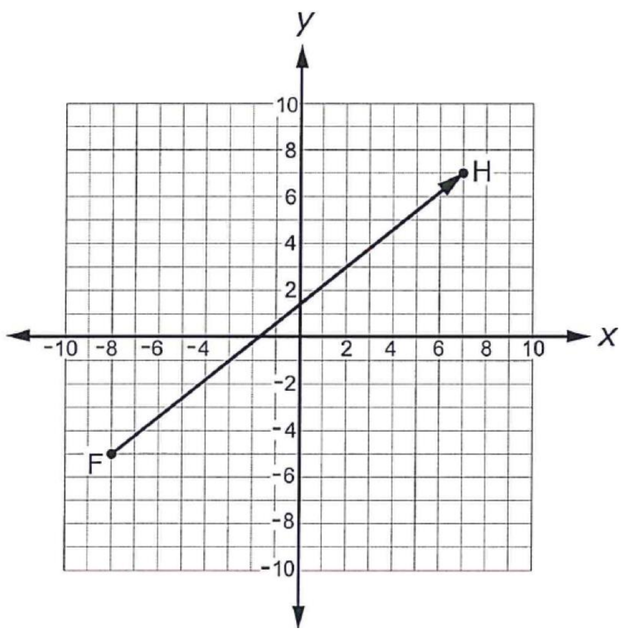
MAFS.912.G-GPE.2.6 EOC Practice

Level 2	Level 3	Level 4	Level 5
finds the point on a line segment that partitions the segment in a given ratio of 1 to 1, given a visual representation of the line segment	finds the point on a line segment that partitions, with no more than five partitions, the segment in a given ratio, given the coordinates for the endpoints of the line segment	finds the endpoint on a directed line segment given the partition ratio, the point at the partition, and one endpoint	finds the point on a line segment that partitions or finds the endpoint on a directed line segment when the coordinates contain variables

1. Given $A(0,0)$ and $B(60,60)$, what are the coordinates of point M that lies on segment AB, such that $AM:MB = 2:3$?

   A. (24, 24)
   B. (24, 36)
   C. (40, 40)
   D. (40, 90)

2. Point G is drawn on the line segment so that the ratio of FG to GH is 5 to 1. What are the coordinates of point G?

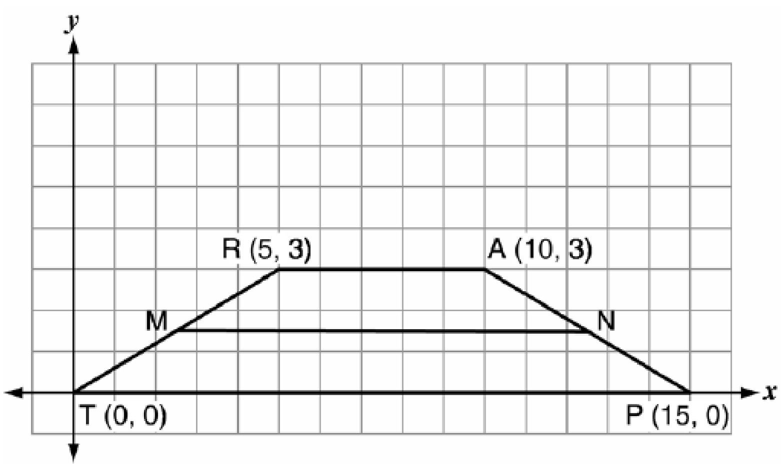


   A. (4, 4.6)
   B. (4.5, 5)
   C. (−5.5, −3)
   D. (−5, −2.6)

3. A city map is placed on a coordinate grid. The post office is located at the point $P(5, 35)$, the library is located at the point $L(15, 10)$, and the fire station is located at the point $F(9, 25)$. What is the ratio of the length of $\overline{PF}$ to the length of $\overline{LF}$?

   A. $2:3$
   B. $3:2$
   C. $2:5$
   D. $3:5$

4. Trapezoid TRAP is shown below.



   What is the length of midsegment $\overline{MN}$?

   A. 10
   B. $\frac{25}{2}$
   C. $\sqrt{234}$
   D. 100

5. Directed line segment PT has endpoints whose coordinates are $P(-2, 1)$ and $T(4, 7)$. Determine the coordinates of point J that divides the segment in the ratio 2 to 1.

6. What are the coordinates of the point on the directed line segment from $K(-5, -4)$ to $L(5,1)$ that partitions the segment into a ratio of 3 to 2?

   A. (-3, -3)
   B. (-1, -2)
   C. $(0, -\frac{3}{2})$
   D. $(1, -1)$

MAFS.912.G-GPE.2.7 EOC Practice

Level 2	Level 3	Level 4	Level 5
finds areas and perimeters of right triangles, rectangles, and squares when given a graphic in a real-world context	when given a graphic, finds area and perimeter of regular polygons where at least two sides have a horizontal or vertical side; finds area and perimeter of parallelograms	finds area and perimeter of irregular polygons that are shown on the coordinate plane; finds the area and perimeter of shapes when given coordinates	finds area and perimeter of shapes when coordinates are given as variables

1. Two of the vertices of a triangle are (0, 1) and (4, 1). Which coordinates of the third vertex make the area of the triangle equal to 16?

A. (0, -9)
B. (0, 5)
C. (4, -7)
D. (4, -3)

2. On a coordinate plane, a shape is plotted with vertices of (3, 1), (0, 4), (3, 7), and (6, 4). What is the area of the shape if each grid unit equals one centimeter?

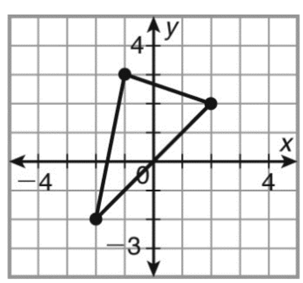
A. 18 cm^2
B. 24 cm^2
C. 36 cm^2
D. 42 cm^2

3. The endpoints of one side of a regular pentagon are $(-1, 4)$ and $(2, 3)$. What is the perimeter of the pentagon?

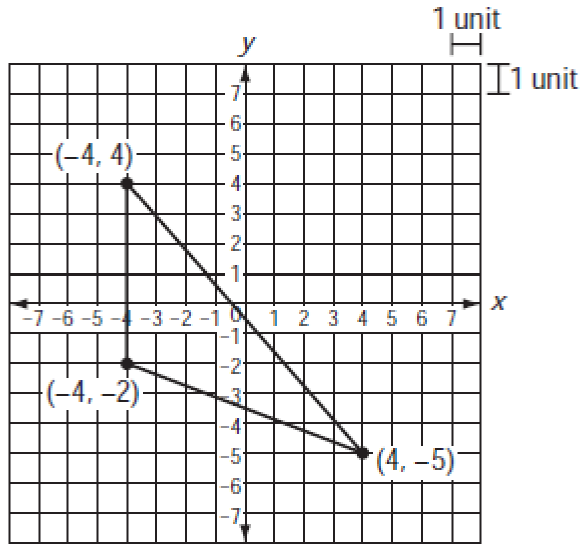
A. $\sqrt{10}$
B. $5\sqrt{10}$
C. $5\sqrt{2}$
D. $25\sqrt{2}$

4. Find the perimeter of the triangle to the nearest whole unit.

A. 12
B. 14
C. 16
D. 18



5. A triangle is shown on the coordinate plane below.



What is the area of the triangle?

A. 12 square units
B. 24 square units
C. 36 square units
D. 48 square units

MFAS Geometry CPALMS Review Packet

Circles, Geometric Measurement, and Geometric Properties

MFAS Geometry EOC Review

Table of Contents

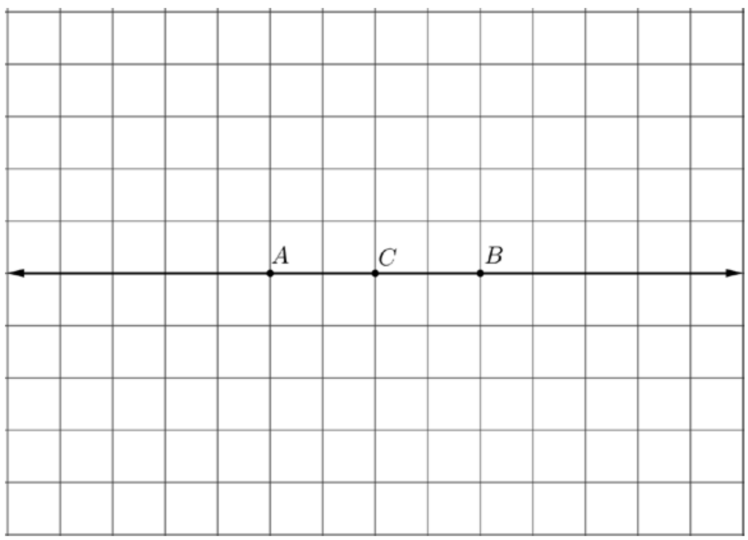
MAFS.912.G-C.1.1

Level 2	Level 3	Level 4	Level 5
identifies that all circles are similar	uses a sequence of no more than two transformations to prove that two circles are similar	uses the measures of different parts of a circle to determine similarity	explains why all circles are similar

Dilation of a Line: Center on the Line

In the figure, points *A*, *B*, and *C* are collinear.

1. Graph the images of points *A*, *B*, and *C* as a result of a dilation with center at point *C* and scale factor of 1.5. Label the images of *A*, *B*, and *C* as A', B', and C', respectively.

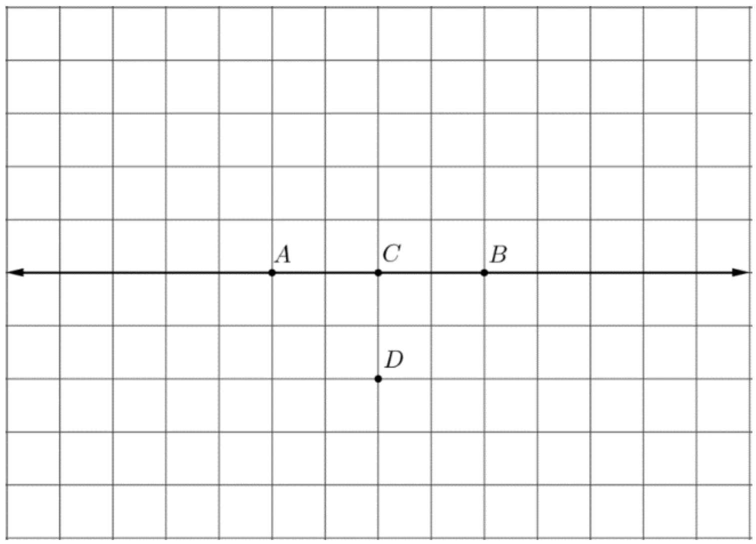


2. Describe the image of $\overleftrightarrow{AB}$ as a result of this dilation. In general, what is the relationship between a line and its image after dilating about a center on the line?

Dilation of a Line: Factor of Two.

In the figure, the points *A*, *B*, and *C* are collinear.

1. Graph the images of points *A*, *B*, and *C* as a result of dilation with center at point *D* and scale factor equal to 2. Label the images of *A*, *B*, and *C* as A', B', and C', respectively.

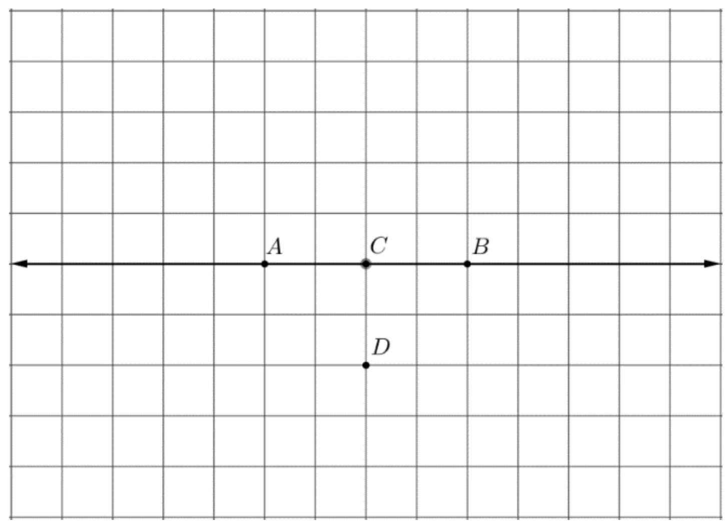


2. Describe the image of $\overleftrightarrow{AB}$ as a result of the same dilation. In general, what is the relationship between a line and its image after dilating about a center not on the line?

Dilation of a Line: Factor of One Half

In the figure, the points *A*, *B*, *C* are collinear.

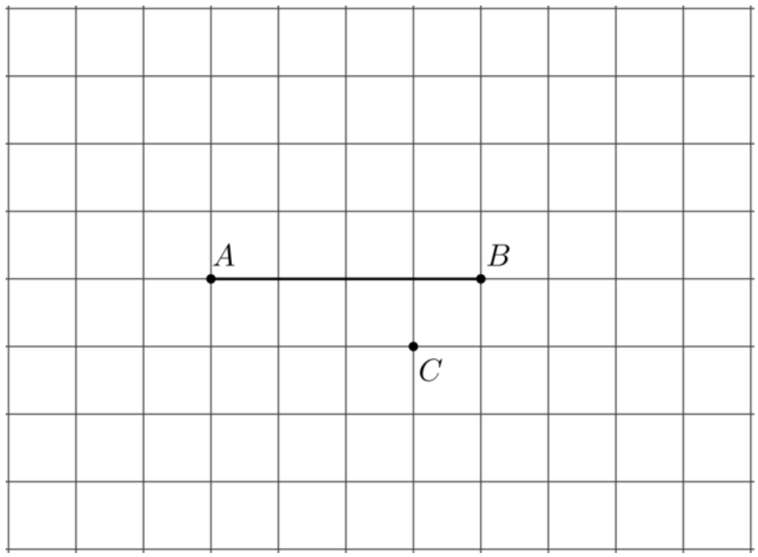
1. Graph the images of points *A*, *B*, *C* as a result of dilation with center at point *D* and scale factor equal to 0.5. Label the images of *A*, *B*, and *C* as A', B', and C', respectively.



2. Describe the image of $\overleftrightarrow{AB}$ as a result of the same dilation. In general, what is the relationship between a line and its image after dilating about a center not on the line?

Dilation of a Line Segment

1. Given $\overline{AB}$, draw the image of $\overline{AB}$ as a result of the dilation with center at point C and scale factor equal to 2.



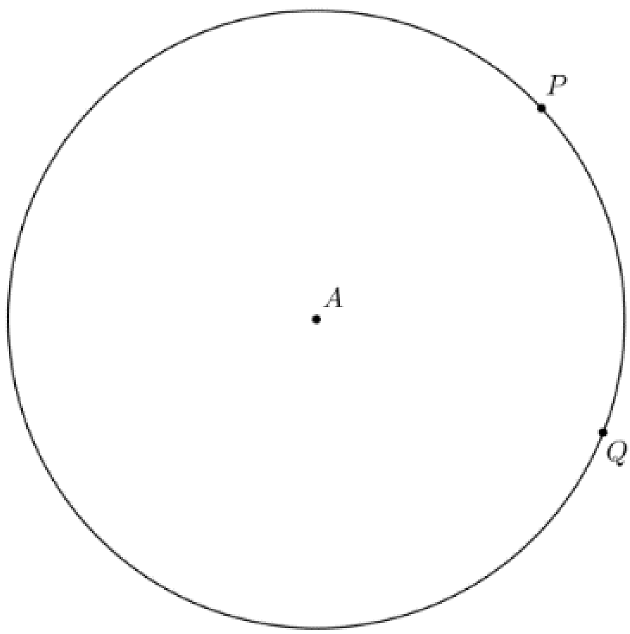
2. Describe the relationship between $\overline{AB}$ and its image.

MAFS.912.G-C.1.2

Level 2	Level 3	Level 4	Level 5
solves problems using the properties of central angles, diameters, and radii	solves problems that use no more than two properties including using the properties of inscribed angles, circumscribed angles, and chords	solves problems that use no more than two properties, including using the properties of tangents	solves problems using at least three properties of central angles, diameters, radii, inscribed angles, circumscribed angles, chords, and tangents

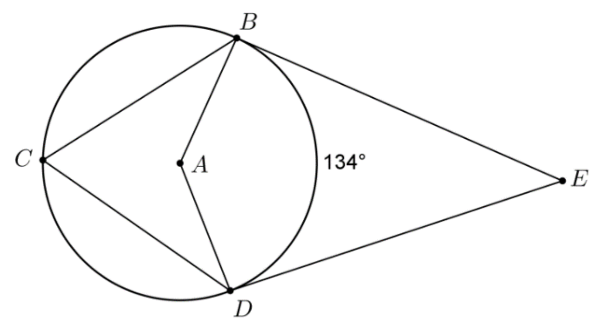
Central and Inscribed Angles

Describe the relationship between an inscribed angle and a central angle that intersect the same arc. Use the circle below to illustrate your reasoning.



Circles with Angles

Use circle *A* below to answer the following questions. Assume points *B*, *C*, and *D* lie on the circle, segments $\overline{BE}$ and $\overline{DE}$ are tangent to circle *A* at points *B* and *D*, respectively, and the measure of $\widehat{BD}$ is $134°$.



1. Identify the type of angle represented by $\angle BAD$, $\angle BCD$, and $\angle BED$ in the diagram and then determine each angle measure. Justify your calculations by showing your work.

    a. $\angle BAD$:
    $m\angle BAD =$

    b. $\angle BCD$:
    $m\angle BCD =$

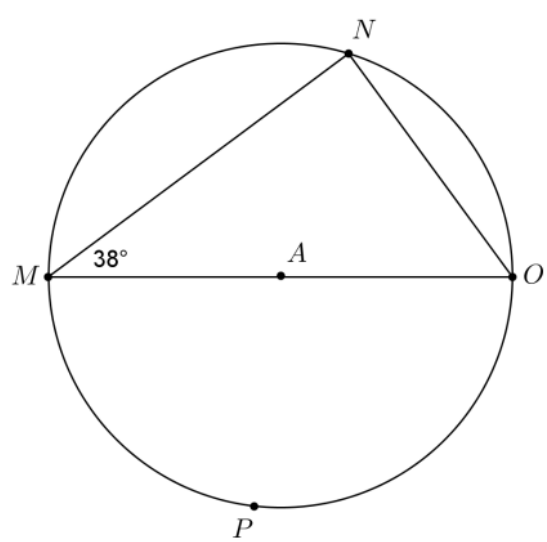
    c. $\angle BED$:
    $m\angle BED =$

2. Describe, in general, the relationship between:

    a. $\angle BAD$ and $\angle BCD$:

    b. $\angle BAD$ and $\angle BED$:

Inscribed Angle on Diameter



1. If point *A* is the center of the circle, what must be true of *m∠MNO*? Justify your answer.

2. Explain how to find the *m∠NOM* .

Tangent Line and Radius

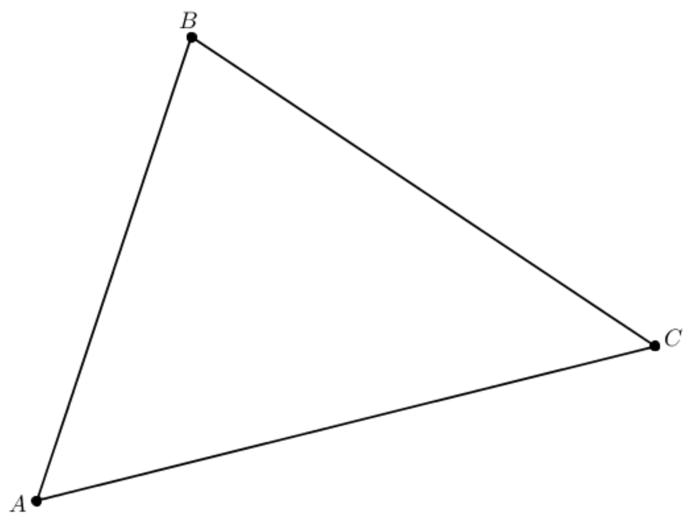
1. Line *t* is tangent to circle *O* at point *P*. Draw circle *O*, line *t,* and radius $\overline{OP}$. Describe the relationship between $\overline{OP}$ and line t.

MAFS.912.G-C.1.3

Level 2	Level 3	Level 4	Level 5
identifies inscribed and circumscribed circles of a triangle	creates or provides steps for the construction of the inscribed and circumscribed circles of a triangle; uses properties of angles for a quadrilateral inscribed in a circle; chooses a property of angles for a quadrilateral inscribed in a circle within an informal argument	solves problems that use the incenter and circumcenter of a triangle; justifies properties of angles of a quadrilateral that is inscribed in a circle; proves properties of angles for a quadrilateral inscribed in a circle	proves the unique relationships between the angles of a triangle or quadrilateral inscribed in a circle

Inscribed Circle Construction

Use a compass and straightedge to construct a circle inscribed in the triangle.

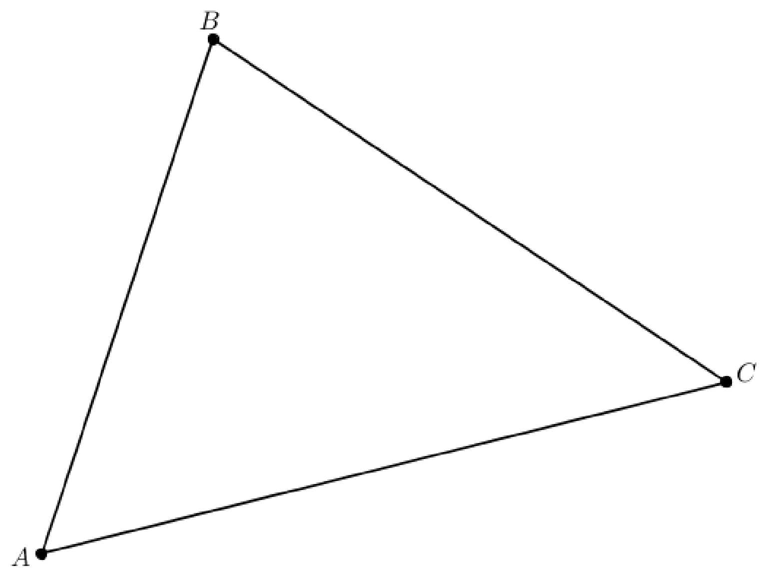


1. What did you construct to locate the center of your inscribed circle?

2. What is the name of the point of concurrency that serves as the center of your inscribed circle?

Circumscribed Circle Construction

Use a compass and straightedge to construct a circle circumscribed about the triangle.

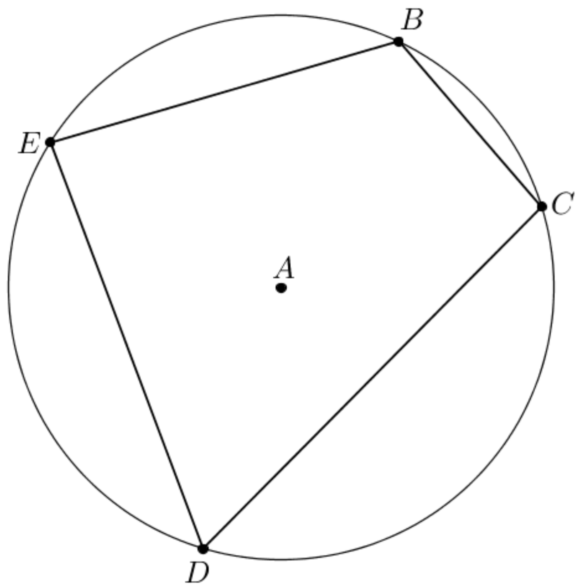


3. What did you construct to locate the center of your circumscribed circle?

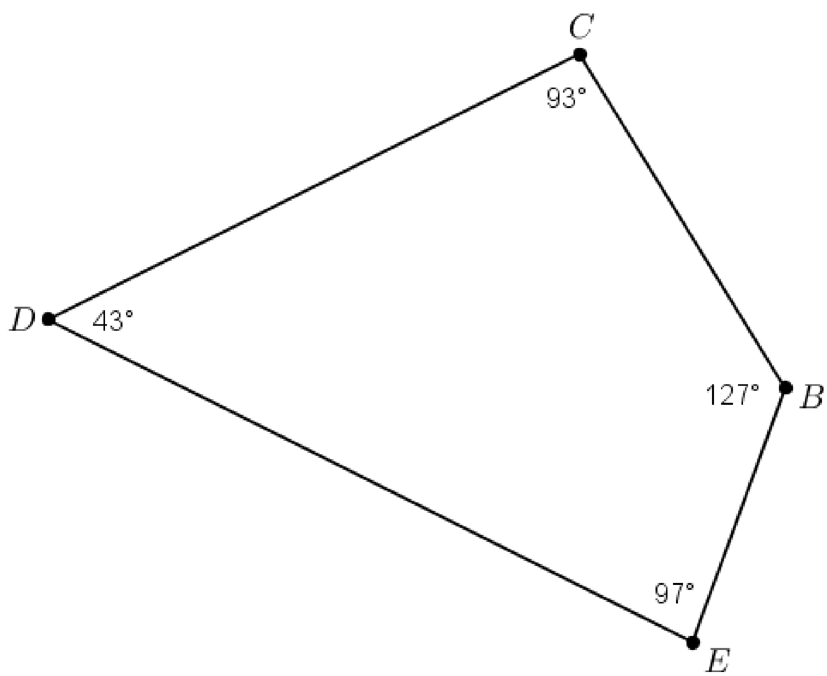
4. What is the name of the point of concurrency that serves as the center of your circumscribed circle?

Inscribed Quadrilaterals

1. Quadrilateral *BCDE* is inscribed in circle *A*. Prove that $\angle EDC$ and $\angle CBE$ are supplementary.



2. Can the quadrilateral below be inscribed in a circle? Explain why or why not.

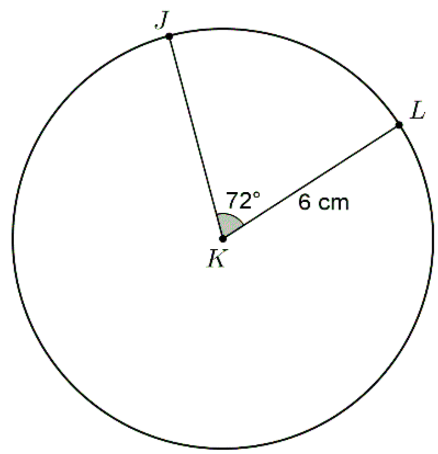


MAFS.912.G-C.2.5

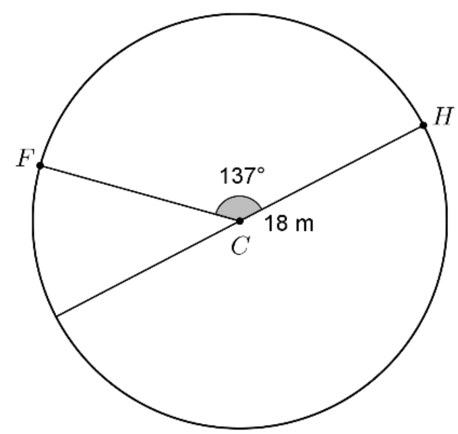
Level 2	Level 3	Level 4	Level 5
identifies a sector area of a circle as a proportion of the entire circle	applies similarity to solve problems that involve the length of the arc intercepted by an angle and the radius of a circle; defines radian measure as the constant of proportionality	derives the formula for the area of a sector and uses the formula to solve problems; derives, using similarity, the fact that the length of the arc intercepted by an angle is proportional to the radius	proves that the length of the arc intercepted by an angle is proportional to the radius, with the radian measure of the angle being the constant of proportionality

Arc Length

1. Find the length of $\widehat{JL}$ of circle *K* in terms of π. Show all of your work carefully and completely.

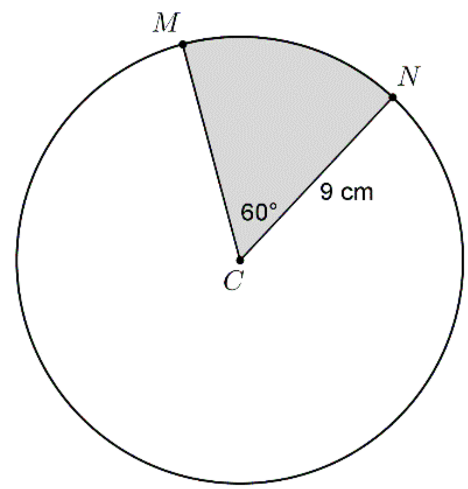


2. Find the length of $\widehat{FH}$ of circle *C*. Round your answer to the nearest hundredth. Show all of your work carefully and completely.

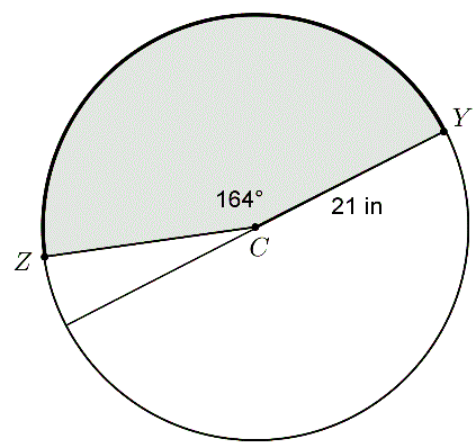


Sector Area

1. Find the area of the shaded sector in terms of π. Show all of your work carefully and completely.



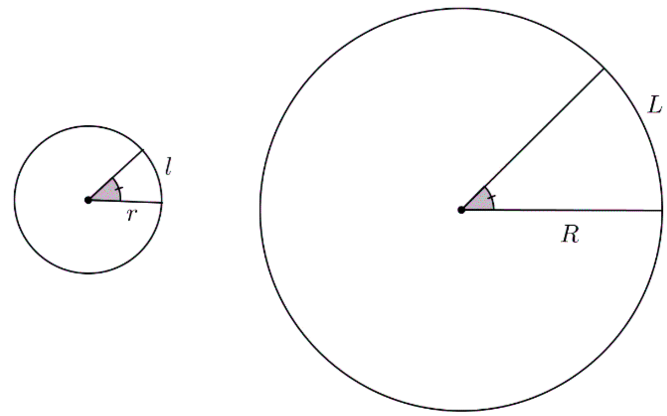
2. Find the area of the shaded sector. Round your answer to the nearest hundredth. Show all of your work carefully and completely.



Arc Length and Radians

Use the similarity of circles to explain why the length of an arc intercepted by an angle is proportional to the radius. That is, given the following diagram:

1. Explain why $\frac{L}{l} = \frac{R}{r}$.



2. Explain how the fact that arc length is proportional to radius leads to a definition of the radian measure of an angle.

Deriving the Sector Area Formula

1. Write a formula that can be used to find the area of a sector of a circle. Be sure to explain what each variable represents. You may include a diagram in your description.

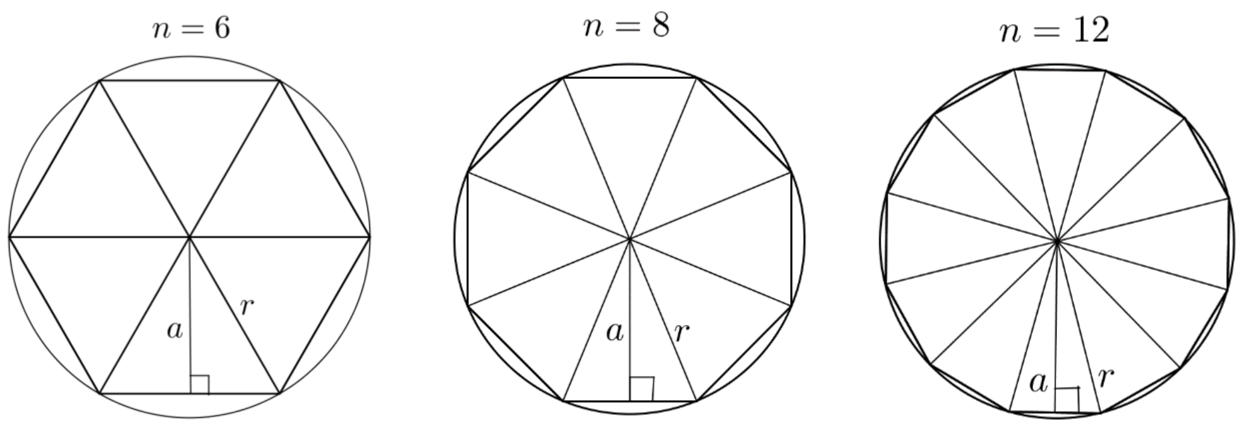
2. Explain and justify the formula you wrote.

MAFS.912.G-GMD.1.1

Level 2	Level 3	Level 4	Level 5
gives an informal argument for the formulas for the circumference of a circle and area of a circle	uses dissection arguments and Cavalier's principle for volume of a cylinder, pyramid, and cone	sequences an informal limit argument for the circumference of a circle, area of a circle, volume of a cylinder, pyramid, and cone	explains how to derive a formula using an informal argument

Area and Circumference – 1

Suppose a regular *n*-gon is inscribed in a circle of radius *r*. Diagrams are shown for *n* = 6, *n* = 8, and *n* = 12.



Imagine how the relationship between the *n*-gon and the circle changes as *n* increases.

1. Describe the relationship between the area of the *n*-gon and the area of the circle as *n* increases.

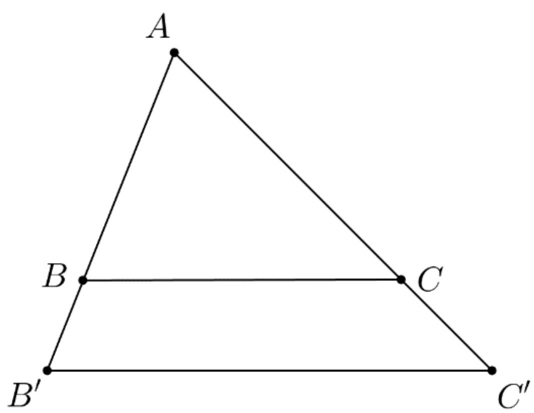
2. Describe the relationship between the perimeter of the *n*-gon and the circumference of the circle as *n* increases.

3. Recall that the area of a regular polygon, A_P, can be found using the formula $A_P = \frac{1}{2}ap$ where a is the apothem and p is the perimeter of the polygon, as shown in the diagram. Consider what happens to a and p in the formula $A_P = \frac{1}{2}ap$ as n increases and derive an equation that describes the relationship between the area of a circle, A, and the circumference of the circle, *C*.

Area and Circumference – 2

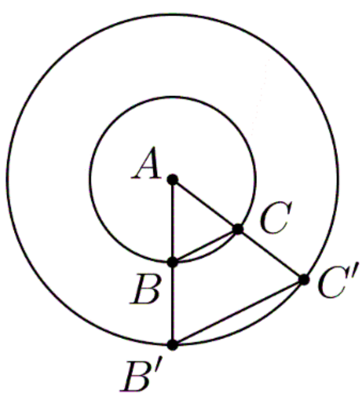
The objective of this exercise is to show that for any circle of radius *r*, the area of the circle, *A*(*r*), can be found in terms of the area of the unit circle, *A*(1). In other words, show that
$A(r) = r^2 \cdot A(1)$.

1. Given ΔABC and $\Delta AB'C'$ such that $AB' = r \cdot AB$ and $AC' = r \cdot AC$, show or explain why the Area of $\Delta AB'C'$ = r^2 · Area of ΔABC.



2. Given two concentric circles with center at *A*, one of radius 1 (that is, *AB* = 1) and the other of radius *r* with *r* > 1 (that is, $AB' = r$), so that $AB' = r \cdot AB$ and $AC' = r \cdot AC$.

Let $\overline{BC}$ be one side of regular *n*-gon P_n inscribed in circle *A* of radius 1 and let $\overline{B'C'}$ be one side of regular *n*-gon P'_n inscribed in circle *A* of radius *r*. Using the result from (1), show or explain why Area of P'_n = r^2 · Area of P_n.



3. Finally, show or explain why $A(r) = r^2 \cdot A(1)$.

Area and Circumference – 3

The unit circle is a circle of radius 1. Define π to be the area, $A(1)$, of the unit circle, that is, $\pi = A(1)$.

Let A represent the area and C represent the circumference of a circle of radius r. Assume each of the following is true:

- The area of a circle is equal to half of the product of the circumference and the radius, that is $A = \frac{1}{2} Cr$.
- The area of a circle is equal to r^2 times the area of the unit circle, that is, $A = r^2 \cdot A(1)$.

Use these two assumptions and the above definition of π to derive:

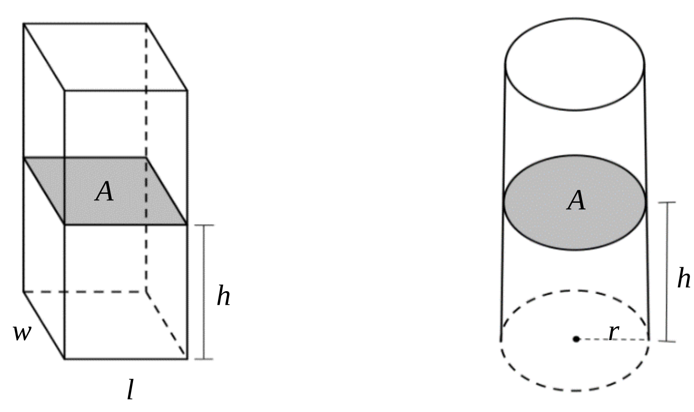
1. The formula for the area, A, of a circle.

2. The formula for the circumference, C, of a circle.

3. The formula for π in terms of C and d, the diameter of a circle.

Volume of a Cylinder

The rectangular prism and the cylinder below have the same height and the same cross-sectional area at any given height above the base. This means that the area of the shaded rectangle, A_1, is the same as the area of the shaded circle, A_2 when $h_1 = h_2$.

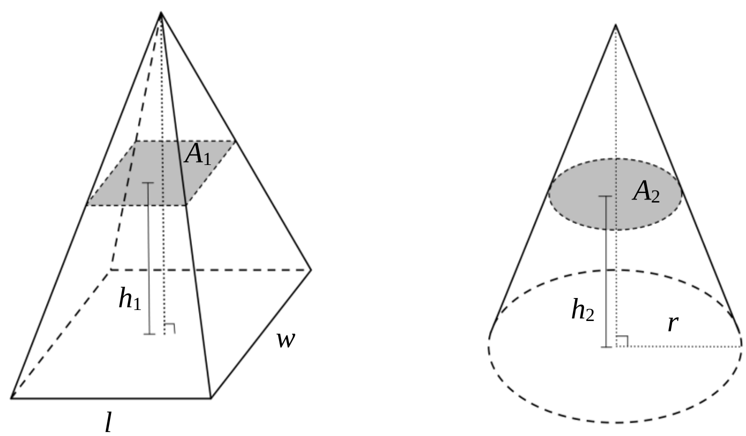


V = Volume
h = height
r = radius

1. Use the formula for the volume of a prism ($V = l \cdot w \cdot h$) to derive and explain the formula for the volume of a cylinder.

Volume of a Cone

The rectangular pyramid and the cone below have the same height and the same cross-sectional area at any given height above the base. This means that the area of the shaded square, A_1, is the same as the area of the shaded circle, $A_2$when $h_1 = h_2$.



V = Volume
h = height
r = radius
l = length
w = width

1. Use the formula for the volume of a rectangular pyramid ($V = \frac{1}{3} \cdot lwh$) to derive and explain the formula for the volume of a cone.

MAFS.912.G-GMD.1.3

Level 2	Level 3	Level 4	Level 5
substitutes given dimensions into the formulas for the volume of cylinders, pyramids, cones, and spheres, given a graphic, in a real-world context	finds a dimension, when given a graphic and the volume for cylinders, pyramids, cones, or spheres	solves problems involving the volume of composite figures that include a cube or prism, and a cylinder, pyramid, cone, or sphere (a graphic would be given); finds the volume when one or more dimensions are changed	finds the volume of composite figures with no graphic; finds a dimension when the volume is changed

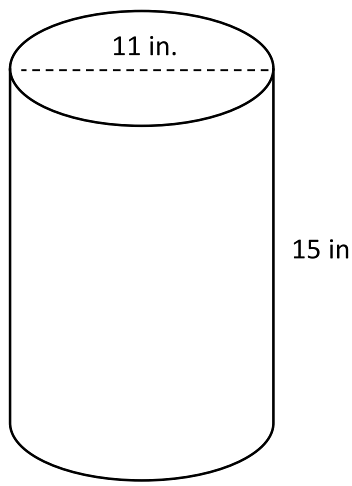
Volume of a Cylinder

The coach at Coastal High School is concerned about keeping her athletes hydrated during practice. She can either buy a case of 24 quart-sized drinks or fill a cylindrical cooler with water and a powder mix. The dimensions of the cylindrical cooler are given below and one quart is equal to 57.75 cubic inches. Which option provides the most drink for her athletes?

1. Look up any formulas you need in your book. Justify your response by showing and/or explaining your work.

Individual Drinks

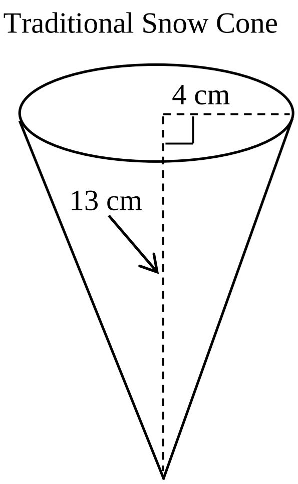
Cylindrical Cooler

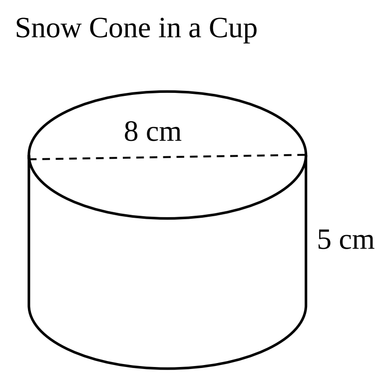


Snow Cones

Jennifer loves snow cones and wants to get the most for her money. There are two vendors at the fair selling snow cones for the same price. If the two containers are completely filled and then leveled off across their tops, which will hold the most? If necessary, round off to the nearest cubic centimeter.

1. Look up any formulas you need in your book. Justify your response by showing and/or explaining your work.

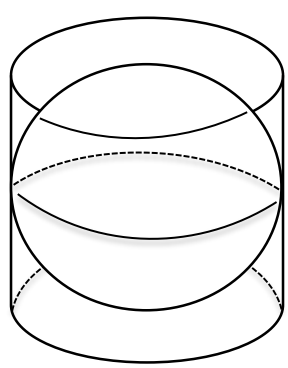




Do Not Spill the Water!

Suppose a ball is completely submerged inside a cylinder filled with water displacing some of the water in the cylinder. Assume the ball and the cylinder both have a diameter of 10 centimeters, and the diameter of the ball is the same as the height of the cylinder.

Determine the volume of water that can remain in the cylinder after the ball is inserted so that the water rises to the top edge of the cylinder without spilling. Look up any formulas you need in your book or notes. Justify your response by showing and/or explaining your work.

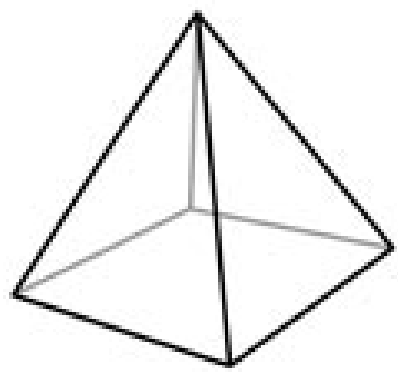


The Great Pyramid

The Great Pyramid of Giza is an example of a square pyramid and is the last surviving structure considered a wonder of the ancient world. The builders of the pyramid used a measure called a cubit, which represents the length of the forearm from the elbow to the tip of the middle finger. One cubit is about 20 inches in length.

Find the height of the Great Pyramid (in cubits) if each base edge is 440 cubits long and the volume of the pyramid is 18,069,330 cubic cubits.

Look up any formulas you need in your book. Justify your response by showing and/or explaining your work.

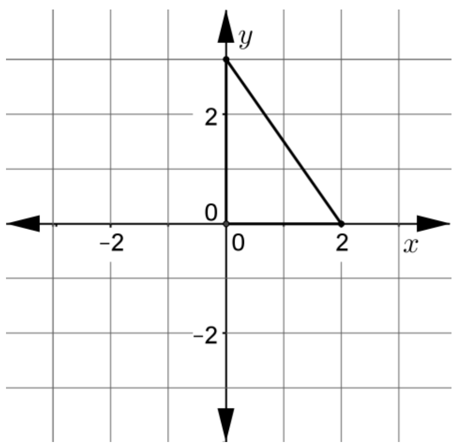


MAFS.912.G-GMD.2.4

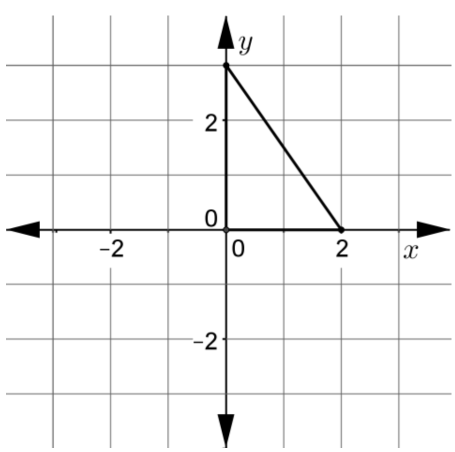
Level 2	Level 3	Level 4	Level 5
identifies the shapes of two-dimensional cross- sections formed by a vertical or horizontal plane	identifies a three-dimensional object generated by rotations of a triangular and rectangular object about a line of symmetry of the object; identifies the location of a horizontal or vertical slice that would give a particular cross-section; draws the shape of a particular two-dimensional cross-section that is the result of horizontal or vertical slice of a three-dimensional shape	identifies a three-dimensional object generated by rotations of a closed two-dimensional object about a line of symmetry of the object; identifies the location of a nonhorizontal or nonvertical slice that would give a particular cross-section; draws the shape of a particular two-dimensional cross-section that is the result of a nonhorizontal or nonvertical slice of a three-dimensional shape; compares and contrasts different types of slices	identifies a three-dimensional object generated by rotations, about a line of symmetry, of an open two-dimensional object or a closed two-dimensional object with empty space between the object and the line of symmetry; compares and contrasts different types of rotations

2D Rotations of Triangles

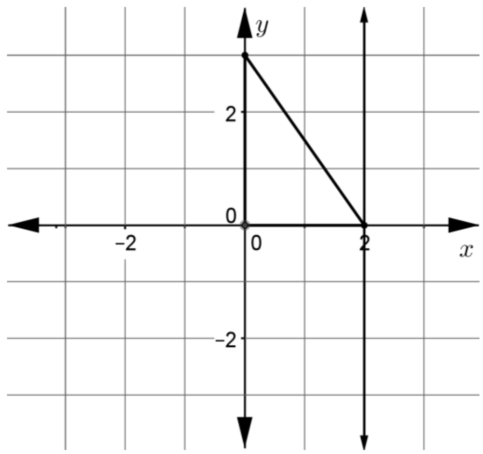
1. Describe in detail the solid formed by rotating a right triangle with vertices at (0, 0), (2, 0), and (0, 3) about the vertical axis. Include the dimensions of the solid in your description.



2. Describe in detail the solid formed by rotating a right triangle with vertices at (0, 0), (2, 0), and (0, 3) about the horizontal axis. Include the dimensions of the solid in your description.

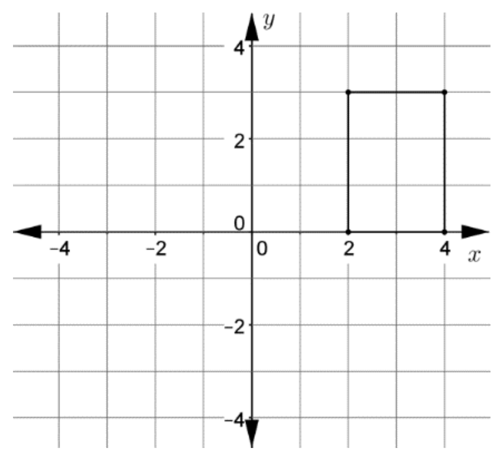


3. Imagine the solid formed by rotating the same right triangle about the line $x = 2$. Describe this solid in detail

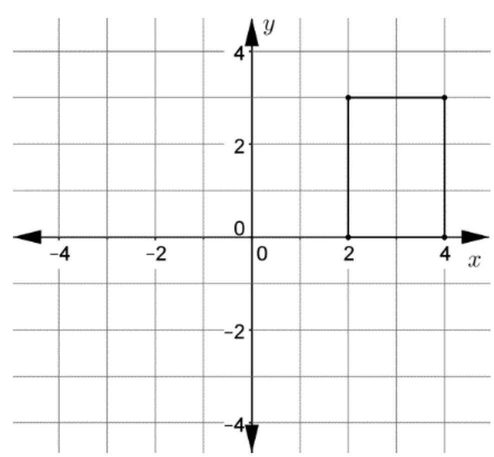


2D Rotations of Rectangles

1. Describe in detail the solid formed by rotating a 2 x 3 rectangle with vertices (2, 0), (4, 0), (2, 3) and (4, 3) about the *x*-axis. Include the dimensions of the solid in your description.



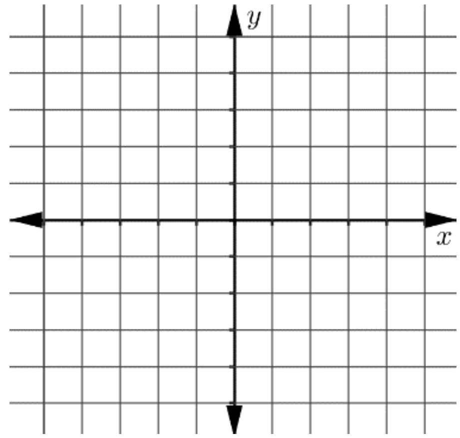
2. Describe in detail the solid formed by rotating a 2 x 3 rectangle with vertices (2, 0), (4, 0), (2, 3), and (4, 3) about the *y*-axis. Include the dimensions of the solid in your description.



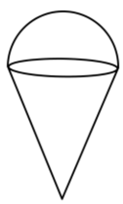
MFAS Geometry EOC Review

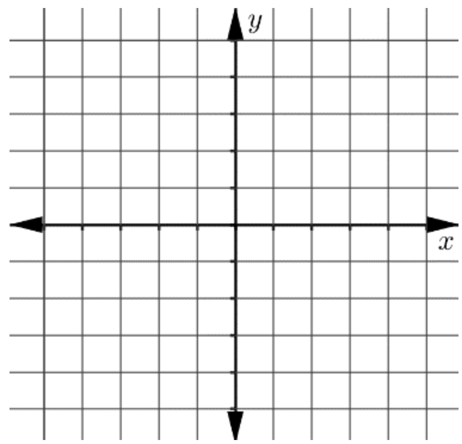
Working Backwards – 2D Rotations

1. Identify and draw a figure that can be rotated around the *y*-axis to generate a sphere.



2. Draw a figure that can be rotated about the *y*-axis to generate the following solid (a hemisphere atop a cone).





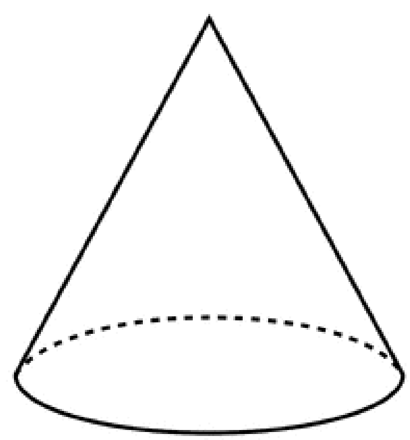
Slice It.

1. Draw and describe the shape of a two-dimensional cross-section that would be visible if you vertically slice the object, perpendicular to the base.

2. Draw and describe the shape of a two-dimensional cross-section that would be visible if you horizontally slice the object, parallel to the base.

Slice of a Cone

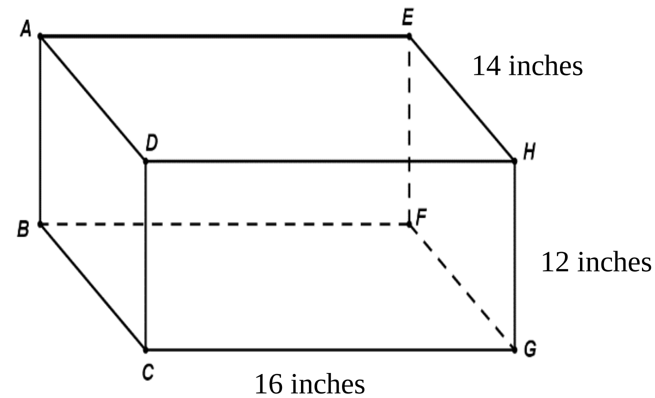
1. Draw three different horizontal cross-sections of the cone that occur at different heights. How are these three cross-sections related?



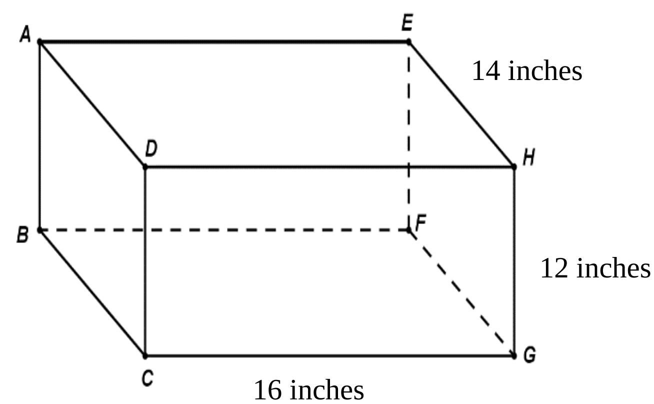
MFAS Geometry EOC Review

Inside the Box

1. In the space provided, sketch both a horizontal and vertical cross section of the box. Label the dimensions on your sketch.



2. Imagine a cross-section defined by plane *EBCH*. Sketch the cross-section and label the dimensions that you know or can find.



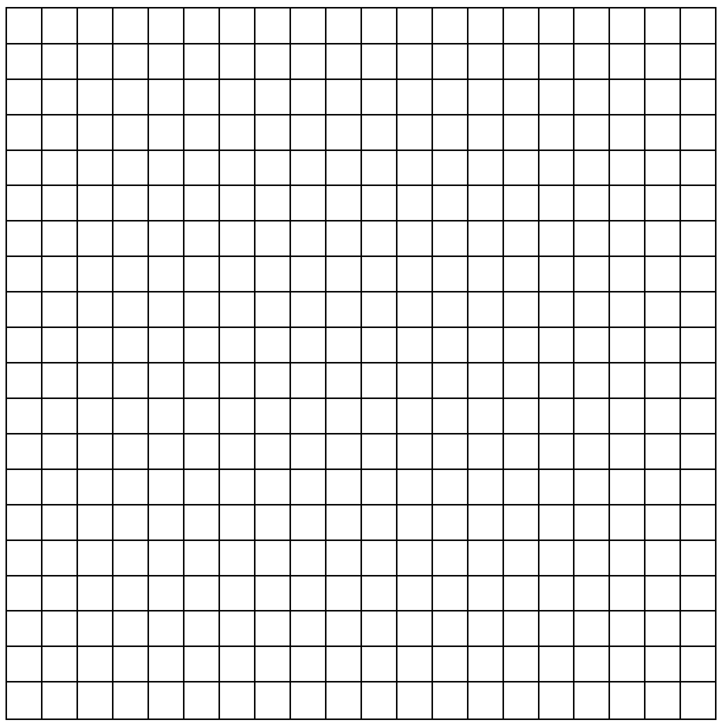
MFAS Geometry EOC Review

MAFS.912.G-GPE.1.1

Level 2	Level 3	Level 4	Level 5
determines the center and radius of a circle given its equation in general form	completes the square to find the center and radius of a circle given by its equation; derives the equation of a circle using the Pythagorean theorem, the coordinates of a circle's center, and the circle's radius	derives the equation of the circle using the Pythagorean theorem when given coordinates of a circle's center and a point on the circle	derives the equation of a circle using the Pythagorean theorem when given coordinates of a circle's center as variables and the circle's radius as a variable

Derive the Circle – Specific Points

1. The center of a circle is at (-5, 7) and its radius is 6 units. Derive the equation of the circle using the Pythagorean Theorem. You may use the coordinate plane to illustrate your reasoning.

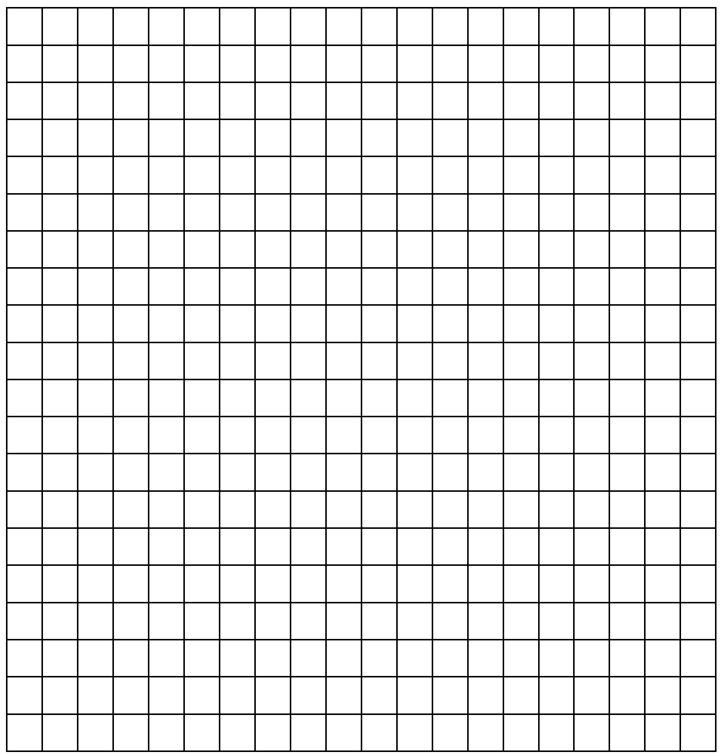


Derive the Circle – General Points

The standard form of the equation of a circle with center (*h*, *k*) and radius *r* is written as:

$$(x - h)^2 + (y - k)^2 = r^2$$

Show how this equation can be derived from the Pythagorean Theorem. Use the coordinate plane to illustrate your reasoning.



Complete the Square for Center-Radius

The equation of a circle in general form is:

$$x^2 + 6x + y^2 + 5 = 0$$

1. Find the center and radius of the circle. Show all work neatly and completely.

Complete the Square for Center-Radius 2

The equation of a circle in general form is:

$$4x^2 - 16x + 4y^2 - 24y + 16 = 0$$

1. Find the center and radius of the circle. Show all work neatly and completely.

MFAS Geometry EOC Review

MAFS.912.G-GPE.2.4

Level 2	Level 3	Level 4	Level 5
uses coordinates to prove or disprove that a figure is a parallelogram	uses coordinates to prove or disprove that a figure is a square, right triangle, or rectangle; uses coordinates to prove or disprove properties of triangles, properties of circles, properties of quadrilaterals when given a graph	uses coordinates to prove or disprove properties of triangles, properties of circles, properties of quadrilaterals without a graph; provide an informal argument to prove or disprove properties of triangles, properties of circles, properties of quadrilaterals; uses coordinates to prove or disprove properties of regular polygons when given a graph	completes an algebraic proof or writes an explanation to prove or disprove simple geometric theorems

Describe the Quadrilateral

1. A quadrilateral has vertices at *A*(-3, 2), *B*(-2, 6), *C*(2, 7) and *D*(1, 3). Which, if any, of the following describe quadrilateral *ABCD*: parallelogram, rhombus, rectangle, square, or trapezoid? Justify your reasoning.

Type of Triangle

1. Triangle *PQR* has vertices at *P*(8, 2), *Q*(11, 13), and *R*(2, 6). Without graphing the vertices, determine if the triangle is scalene, isosceles, or equilateral. Show all of your work and justify your decision.

Diagonals of a Rectangle

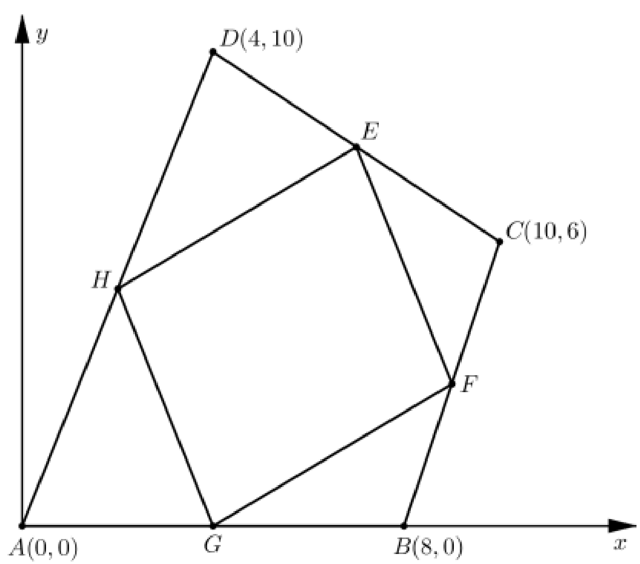
Three of the vertices of a rectangle have coordinates *D*(0, 0), *A*(*a*, 0), and *B*(0, *b*).

1. Find the coordinates of point *C*, the fourth vertex.

2. Prove that the diagonals of the rectangle are congruent.

Midpoints of Sides of a Quadrilateral

Show that the quadrilateral formed by connecting the midpoints of the sides of quadrilateral *ABCD* (points *E*, *F*, *G*, and *H*) is a parallelogram.



MAFS.912.G-GPE.2.5

Level 2	Level 3	Level 4	Level 5
identifies that the slopes of parallel lines are equal	creates the equation of a line that is parallel given a point on the line and an equation, in slope-intercept form, of the parallel line or given two points (coordinates are integral) on the line that is parallel; creates the equation of a line that is perpendicular given a point on the line and an equation of a line, in slope- intercept form	creates the equation of a line that is parallel given a point on the line and an equation, in a form other than slope-intercept; creates the equation of a line that is perpendicular that passes through a specific point when given two points or an equation in a form other than slope-intercept	proves the slope criteria for parallel and perpendicular lines; writes equations of parallel or perpendicular lines when the coordinates are written using variables or the slope and y-intercept for the given line contains a variable

Writing Equations for Parallel Lines

1. In right trapezoid *ABCD*, $\overline{BC} \parallel \overline{AD}$ and $\overline{AD}$ is contained in the line whose equation is $y = -\frac{1}{2}x + 10$.

   a. What is the slope of the line containing $\overline{BC}$? Briefly explain how you got your answer.

   b. Write an equation in **slope-intercept form** of the line that contains $\overline{BC}$ if *B* is located at $(-2, 7)$. Show your work to justify your answer.

2. In rectangle *EFGH*, $\overline{EH} \parallel \overline{FG}$ and $\overline{EH}$ crosses the *y*-axis at $(0, -2)$. If the equation of the line containing $\overline{FG}$ is $x + 3y = 12$, write the equation of the line containing $\overline{EH}$ in **slope-intercept form.** Show your work to justify your answer.

MFAS Geometry EOC Review

Writing Equations for Perpendicular Lines

1. In right trapezoid *ABCD*, $\overline{AB} \perp \overline{AD}$ and $\overline{AD}$ is contained in the line $y = -\frac{1}{2}x + 10$.

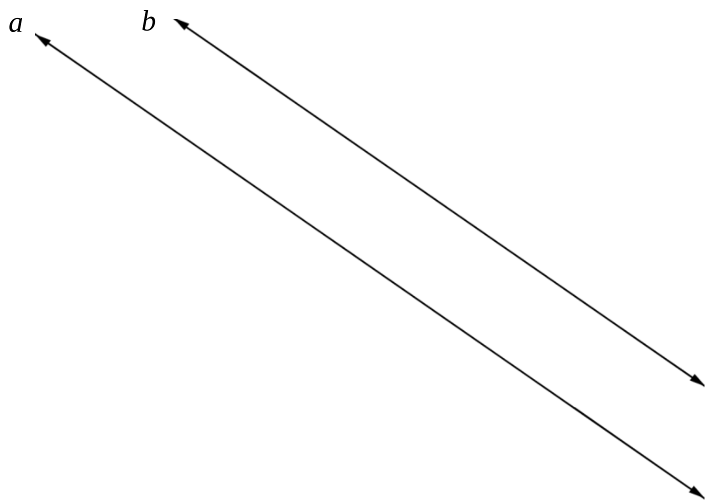
   a. What is the slope of the line containing $\overline{AB}$? Briefly explain how you got your answer.

   b. Write an equation in **slope-intercept form** of the line that contains $\overline{AB}$ if *B* is located at $(-2, 7)$. Show your work to justify your answer.

2. In rectangle *EFGH*, $\overline{EF} \perp \overline{FG}$ and $\overline{EF}$ contains the point (0, -4). If the equation of the line containing $\overline{FG}$ is $2x + 6y = 9$, write the equation of the line containing $\overline{EF}$ in **slope-intercept form.** Show your work to justify your answer.

Proving Slope Criterion for Parallel Lines – One

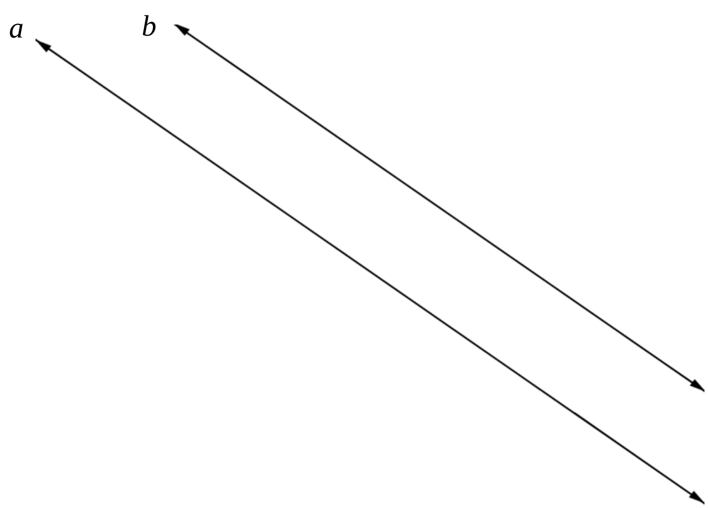
Line *a* is parallel to line *b*. Prove that the slope of line *a* equals the slope of line *b*.



Note: You may draw axes placing the lines in the coordinate plane if you prefer.

Proving Slope Criterion for Parallel Lines – Two

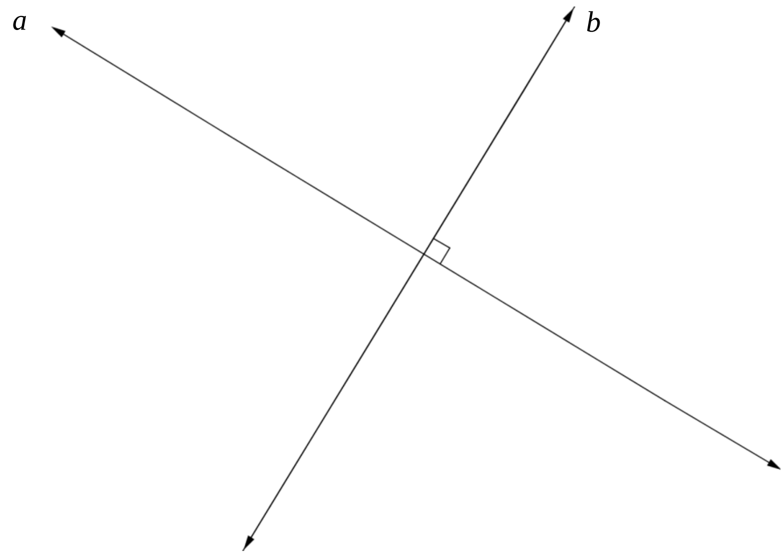
The slope of line *a* equals the slope of line *b*. Prove that line *a* is parallel to line *b*.



Note: You may draw axes placing the lines in the coordinate plane if you prefer.

Proving Slope Criterion for Perpendicular Lines – One

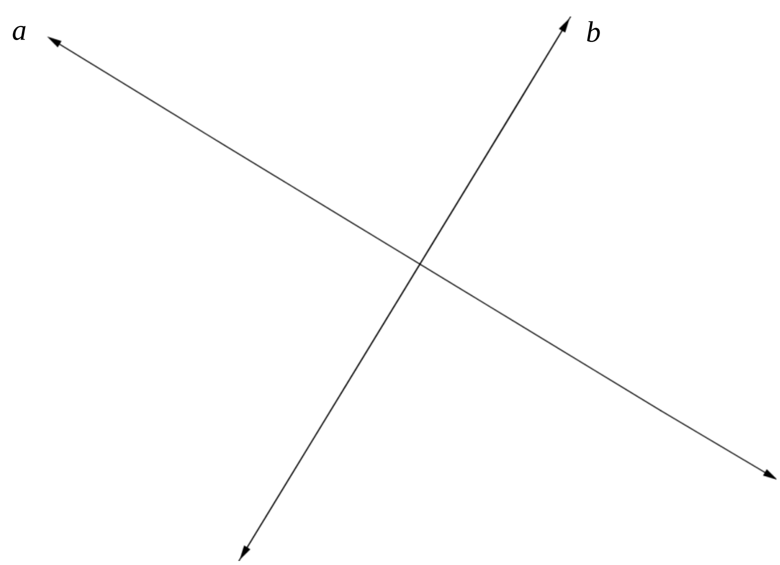
Line *a* is perpendicular to line *b*. Prove that the slopes of line *a* and line *b* are both opposite and reciprocal (or that the product of their slopes is –1).



Note: You may draw axes placing the lines in the coordinate plane if you prefer.

Proving Slope Criterion for Perpendicular Lines – Two

The slope of line *a* and the slope of line *b* are both opposite and reciprocal. Prove that line *a* is perpendicular to line *b*.



Note: You may draw axes placing the lines in the coordinate plane if you prefer.

MAFS.912.G-GPE.2.6

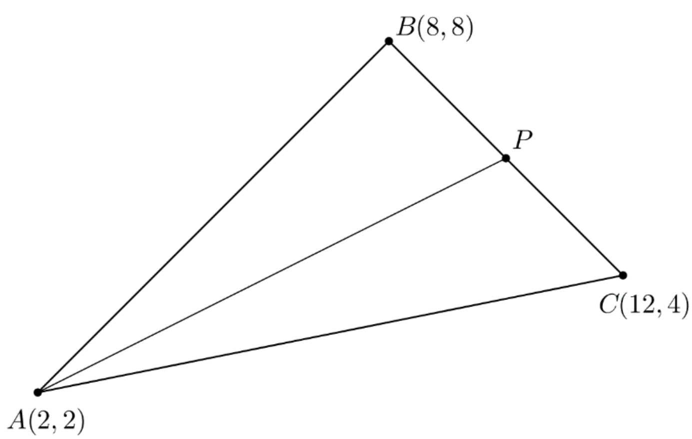
Level 2	Level 3	Level 4	Level 5
finds the point on a line segment that partitions the segment in a given ratio of 1 to 1, given a visual representation of the line segment	finds the point on a line segment that partitions, with no more than five partitions, the segment in a given ratio, given the coordinates for the endpoints of the line segment	finds the endpoint on a directed line segment given the partition ratio, the point at the partition, and one endpoint	finds the point on a line segment that partitions or finds the endpoint on a directed line segment when the coordinates contain variables

Partitioning a Segment

Given *M*(-4, 7) and *N*(12, -1), find the coordinates of point *P* on $\overline{MN}$ so that *P* partitions $\overline{MN}$ in the ratio 1:7 (i.e., so that *MP*:*PN* is 1:7). Show all of your work and explain your method and reasoning.

Centroid Coordinates

In ΔABC, $\overline{AP}$ is a median. Find the exact coordinates of a point, *D*, on $\overleftrightarrow{AP}$ so that $AD:DP = 2:1$.
Show all of your work and explain your method and reasoning.

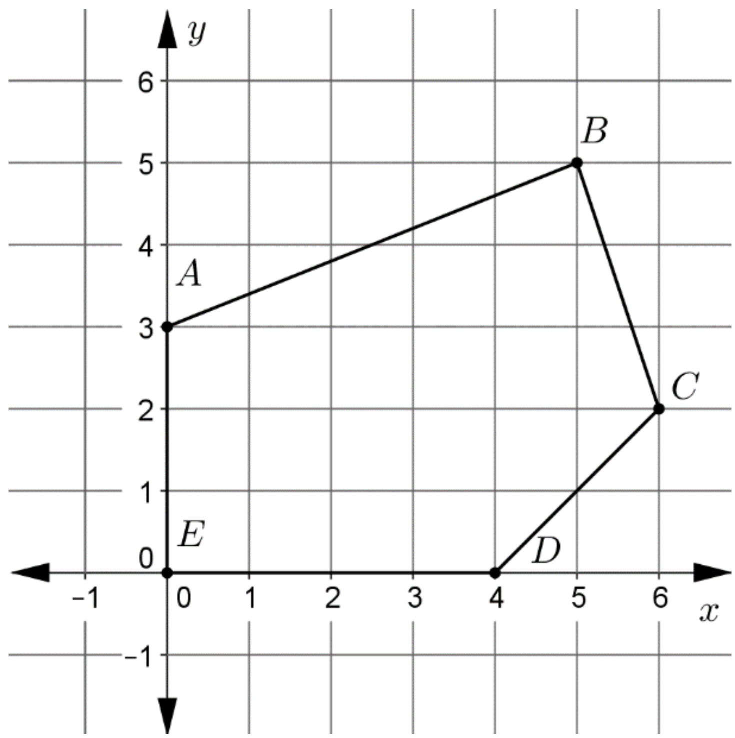


MAFS.912.G-GPE.2.7

Level 2	Level 3	Level 4	Level 5
finds areas and perimeters of right triangles, rectangles, and squares when given a graphic in a real-world context	when given a graphic, finds area and perimeter of regular polygons where at least two sides have a horizontal or vertical side; finds area and perimeter of parallelograms	finds area and perimeter of irregular polygons that are shown on the coordinate plane; finds the area and perimeter of shapes when given coordinates	finds area and perimeter of shapes when coordinates are given as variables

Pentagon's Perimeter

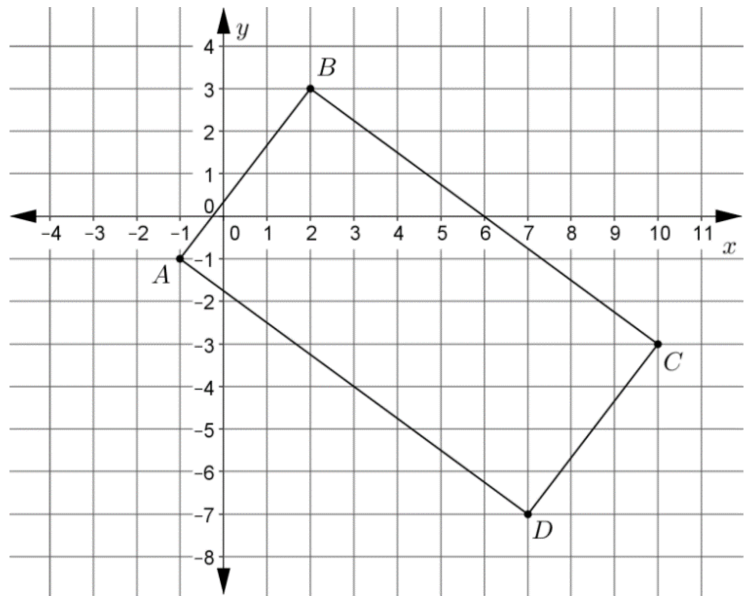
Find the perimeter of polygon *ABCDE* with vertices *A*(0, 3), *B*(5, 5), *C*(6, 2), *D*(4, 0) and *E*(0, 0). Show your work.



Perimeter and Area of a Rectangle

Find the perimeter and the area of rectangle *ABCD* with vertices *A*(-1, -1), *B*(2, 3), *C*(10, -3) and *D*(7, -7). Show your work.

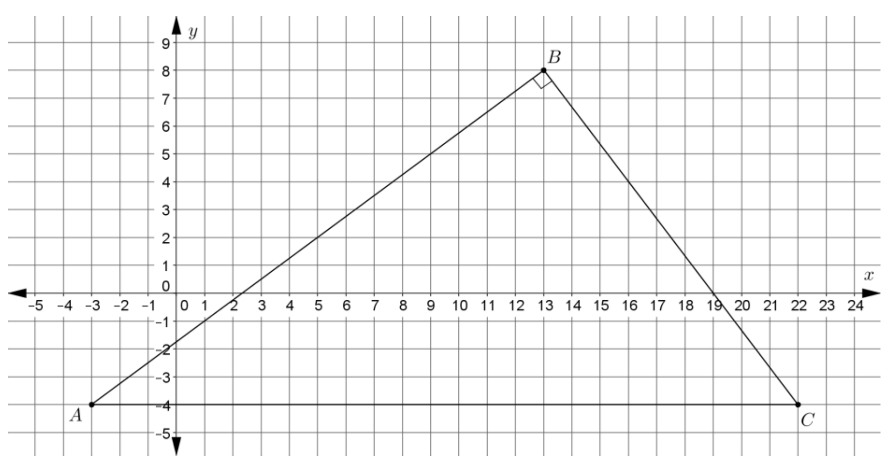
Perimeter _______________ Area _______________



Perimeter and Area of a Right Triangle

Find the perimeter and the area of right triangle *ABC* with vertices *A*(-3, -4), *B*(13, 8) and *C*(22, -4). Show your work.

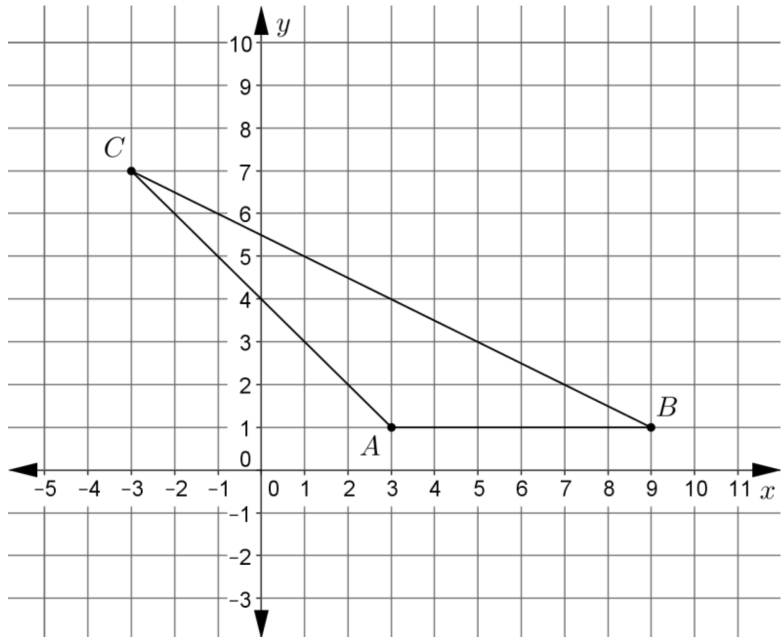
Perimeter _______________ Area _______________



Perimeter and Area of an Obtuse Triangle

Find the perimeter and the area of Δ*ABC* with vertices *A*(3, 1), *B*(9, 1) and *C*(-3, 7). Show your work. Round to the nearest tenth if necessary.

Perimeter ________________ Area _________________



FSA Geometry End-of-Course Review Packet

Congruency Similarity and Right Triangles

Table of Contents

MAFS.912.G-CO.1.1 EOC Practice

Level 2	Level 3	Level 4	Level 5
uses definitions to choose examples and non-examples	uses precise definitions that are based on the undefined notions of point, line, distance along a line, and distance around a circular arc	analyzes possible definitions to determine mathematical accuracy	explains whether a possible definition is valid by using precise definitions

1. Let's say you opened your laptop and positioned the screen so it's exactly at 90°—a right angle—from your keyboard. Now, let's say you could take the screen and push it all the way down beyond 90°, until the back of the screen is flat against your desk. It looks as if the angle disappeared, but it hasn't. What is the angle called, and what is its measurement?

   A. Straight angle at 180°
   B. Linear angle at 90°
   C. Collinear angle at 120°
   D. Horizontal angle at 180°

2. What is defined below?
   __________: a portion of a line bounded by two points

   A. arc
   B. axis
   C. ray
   D. segment

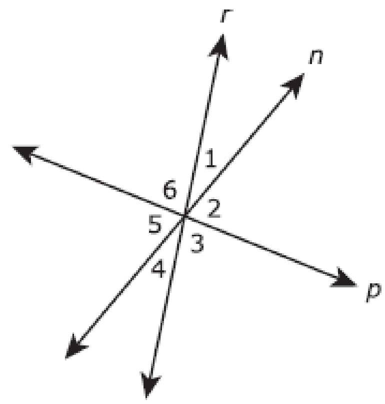
3. Given $\overleftrightarrow{XY}$ and $\overleftrightarrow{ZW}$ intersect at point A.
   Which conjecture is **always** true about the given statement?

   A. $XA = AY$
   B. $\angle XAZ$ is acute.
   C. $\overleftrightarrow{XY}$ is perpendicular to $\overleftrightarrow{ZW}$
   D. X, Y, Z, and W are noncollinear.

4. The figure shows lines r, n, and p intersecting to form angles numbered 1, 2, 3, 4, 5, and 6. All three lines lie in the same plane.

   Based on the figure, which of the individual statements would provide enough information to conclude that line r is perpendicular to line p? Select **ALL** that apply.

- ☐ $m\angle 2 = 90°$
- ☐ $m\angle 6 = 90°$
- ☐ $m\angle 3 = m\angle 6$
- ☐ $m\angle 1 + m\angle 6 = 90°$
- ☐ $m\angle 3 + m\angle 4 = 90°$
- ☐ $m\angle 4 + m\angle 5 = 90°$



5. Match each term with its definition.

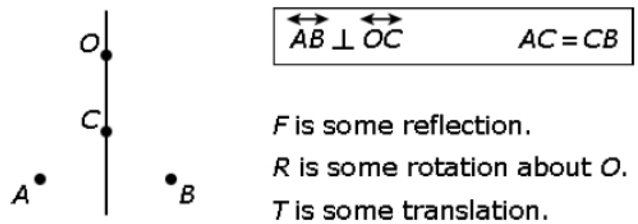
A	A portion of a line consisting of two points and all points between them.
B	A connected straight path. It has no thickness and it continues forever in both directions.
C	A figure formed by two rays with the same endpoint.
D	The set of all points in a plane that are a fixed distance from a point called the center.
E	A portion of a line that starts at a point and continues forever in one direction.
F	Lines that intersect at right angles.
G	A specific location, it has no dimension and is represented by a dot.
H	Lines that lie in the same plane and do not intersect

☐	perpendicular lines
☐	angle
☐	line segment
☐	parallel lines
☐	circle
☐	point
☐	line
☐	ray

MAFS.912.G-CO.1.2 EOC Practice

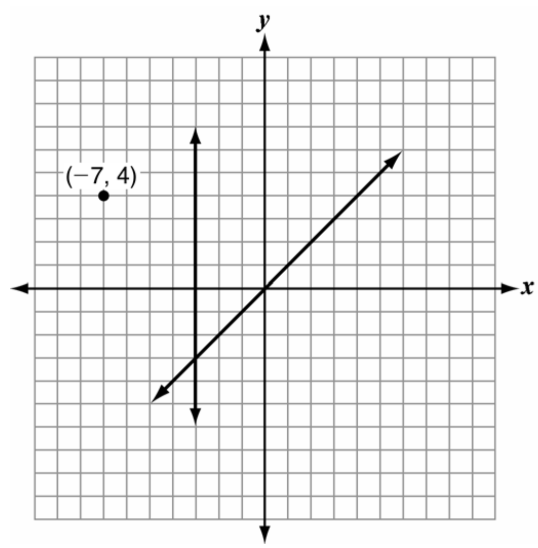
Level 2	Level 3	Level 4	Level 5
represents transformations in the plane; determines transformations that preserve distance and angle to those that do not	uses transformations to develop definitions of angles, perpendicular lines, parallel lines; describes translations as functions	uses transformations to develop definitions of circles and line segments; describes rotations and reflections as functions	[intentionally left blank]

1. A transformation takes point A to point B. Which transformation(s) could it be?



   A. F only
   B. F and R only
   C. F and T only
   D. F, R, and T

2. The point $(-7,4)$ is reflected over the line $x = -3$. Then, the resulting point is reflected over the line $y = x$. Where is the point located after both reflections?



   A. $(-10,-7)$
   B. $(1,4)$
   C. $(4,-7)$
   D. $(4,1)$

3. Given: $\overline{AB}$ with coordinates of $A(-3,-1)$ and $B(2,1)$
   $\overline{A'B'}$ with coordinates of $A'(-1,2)$ and $B'(4,4)$

   Which translation was used?

   A. $(x', y') \rightarrow (x+2, y+3)$
   B. $(x', y') \rightarrow (x+2, y-3)$
   C. $(x', y') \rightarrow (x-2, y+3)$
   D. $(x', y') \rightarrow (x-2, y-3)$

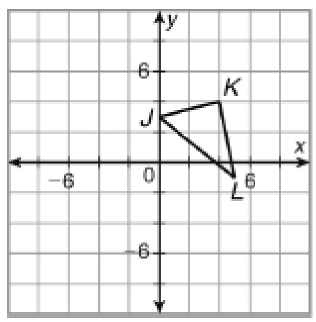
4. Point P is located at (4, 8) on a coordinate plane. Point P will be reflected over the x-axis. What will be the coordinates of the image of point P?

   A. $(28, 4)$
   B. $(24, 8)$
   C. $(4,28)$
   D. $(8, 4)$

5. Point F' is the image when point F is reflected over the line $x = -2$ and then over the line $y = 3$. The location of F' is $(3, 7)$. Which of the following is the location of point F?

   A. $(-7, -1)$
   B. $(-7, 7)$
   C. $(1, 5)$
   D. $(1, 7)$

6. ΔJKL is rotated 90° about the origin and then translated using $(x, y) \rightarrow (x - 8, y + 5)$. What are the coordinates of the final image of point L under this composition of transformations?

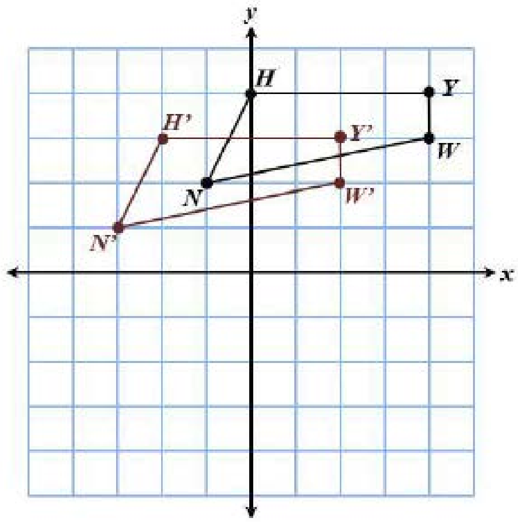


   A. $(-7, 10)$
   B. $(-7, 0)$
   C. $(-9, 10)$
   D. $(-9, 0)$

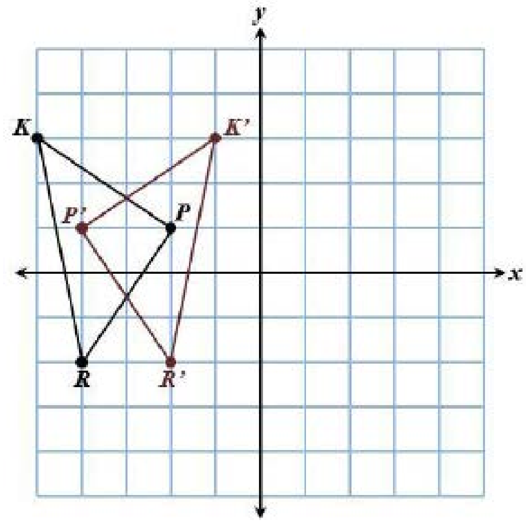
MAFS.912.G-CO.1.4 EOC Practice

Level 2	Level 3	Level 4	Level 5
represents transformations in the plane; determines transformations that preserve distance and angle to those that do not	uses transformations to develop definitions of angles, perpendicular lines, parallel lines; describes translations as functions	uses transformations to develop definitions of circles and line segments; describes rotations and reflections as functions	[intentionally left blank]

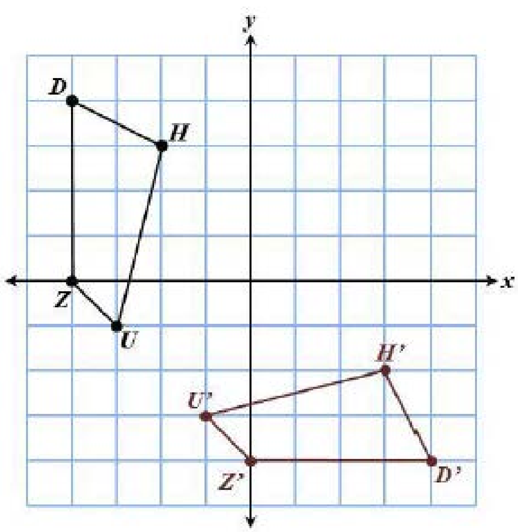
1. The graph of a figure and its image are shown below. Identify the transformation to map the image back onto the figure.



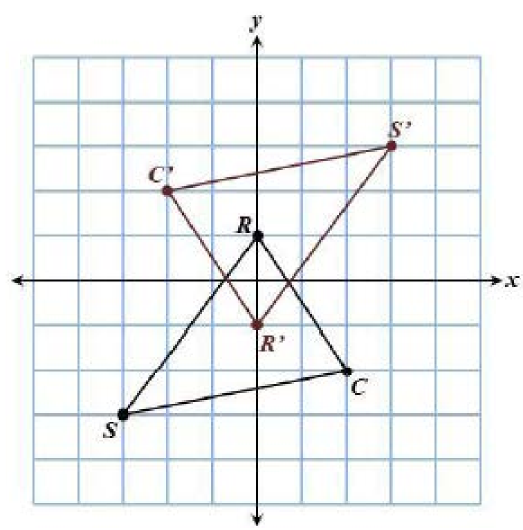
O Reflection
O Rotation
O Translation



O Reflection
O Rotation
O Translation



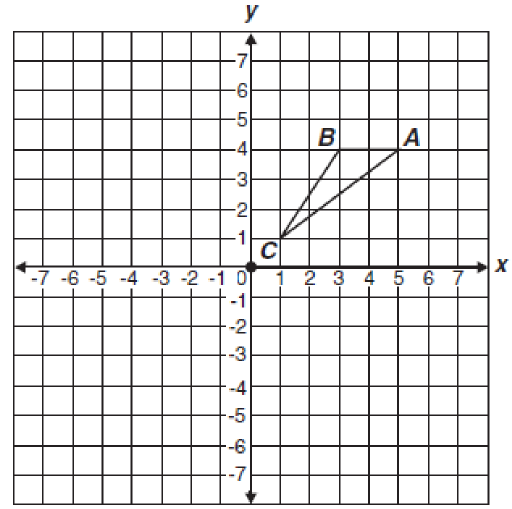
O Reflection
O Rotation
O Translation



O Reflection
O Rotation
O Translation

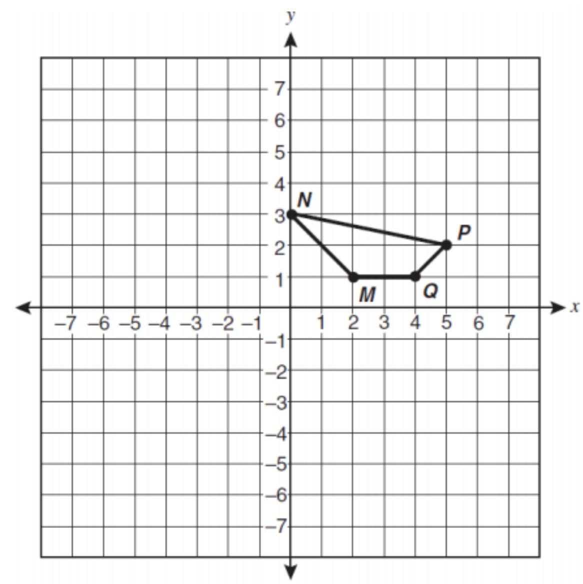
2. If triangle ABC is rotated 180 degrees about the origin, what are the coordinates of A'?

   $A'(\ \ ,\ \ )$



3. Darien drew a quadrilateral on a coordinate grid.
   Darien rotated the quadrilateral 180 and then translated it left 4 units. What are the coordinates of the image of point P?

   $P(\ \ ,\ \ )$



4. What is the image of $M(11,-4)$ using the translation $(x,y) \rightarrow x-17, y+2$?

   A. $M'(-6,-2)$
   B. $M'(6,2)$
   C. $M'(-11,4)$
   D. $M'(-4,11)$

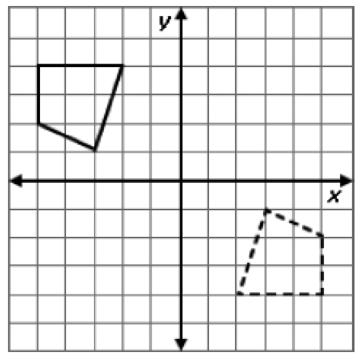
5. A person facing east walks east 20 paces, turns, walks north 10 paces, turns, walks west 25 paces, turns, walks south 10 paces, turns, walks east 15 paces, and then stops. What one transformation could have produced the same final result in terms of the position of the person and the direction the person faces?

   A. reflection over the north-south axis
   B. rotation
   C. translation
   D. reflection over the east-west axis

MAFS.912.G-CO.1.5 EOC Practice

Level 2	Level 3	Level 4	Level 5
chooses a sequence of two transformations that will carry a given figure onto itself or onto another figure	uses transformations that will carry a given figure onto itself or onto another figure	uses algebraic descriptions to describe rotations and/or reflections that will carry a figure onto itself or onto another figure	applies transformations that will carry a figure onto another figure or onto itself, given coordinates of the geometric figure in the stem

1. Which transformation maps the solid figure onto the dashed figure?



A. rotation 180° about the origin
B. translation to the right and down
C. reflection across the x-axis
D. reflection across the y-axis

2. Ken stacked 2 number cubes. Each cube was numbered so that opposite faces have a sum of 7.

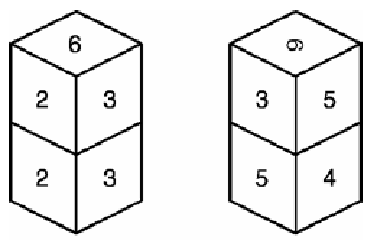


Figure P Figure Q

Which transformation did Ken use to reposition the cubes from figure P to figure Q?

A. Rotate the top cube $180°$, and rotate the bottom cube $180°$.
B. Rotate the top cube $90°$ clockwise, and rotate the bottom cube $180°$.
C. Rotate the top cube $90°$ counterclockwise, and rotate the bottom cube$180°$.
D. Rotate the top cube $90°$ counterclockwise, and rotate the bottom cube $90°$ clockwise.

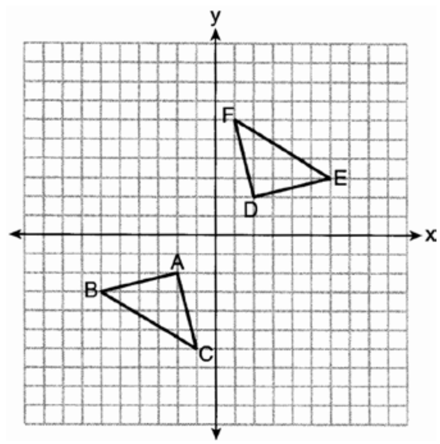
3. A triangle has vertices at $A(-7,6), B(4,9), C(-2,-3)$. What are the coordinates of each vertex if the triangle is translated 4 units right and 6 units down?

A. $A'(-11,12), B'(0,15), C'(-6,3)$
B. $A'(-11,0), B'(0,3), C'(-6,-9)$
C. $A'(-3,12), B'(8,15), C'(2,3)$
D. $A'(-3,0), B'(8,3), C'(2,-9)$

4. A triangle has vertices at $A(-3,-1), B(-6,-5), C(-1,-4)$. Which transformation would produce an image with vertices $A'(3,-1), B'(6,-5), C'(1,-4)$?

   A. a reflection over the $x-axis$
   B. a reflection over the $y-axis$
   C. a rotation $90°$ clockwise
   D. a rotation $90°$ counterclockwise

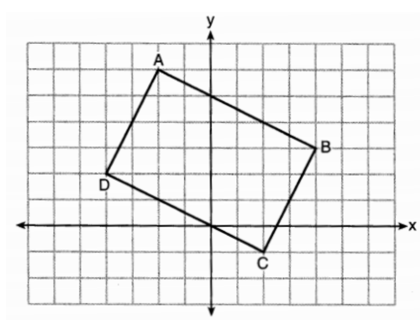
5. Triangle ABC and triangle DEF are graphed on the set of axes below.



   Which sequence of transformations maps triangle ABC onto triangle DEF?

   A. a reflection over the x —axis followed by a reflection over the y —axis
   B. a $180°$ rotation about the origin followed by a reflection over the line $y = x$
   C. a $90°$ clockwise rotation about the origin followed by a reflection over the y —axis
   D. a translation 8 units to the right and 1 unit up followed by a $90°$ counterclockwise rotation about the origin

6. Quadrilateral ABCD is graphed on the set of axes below.



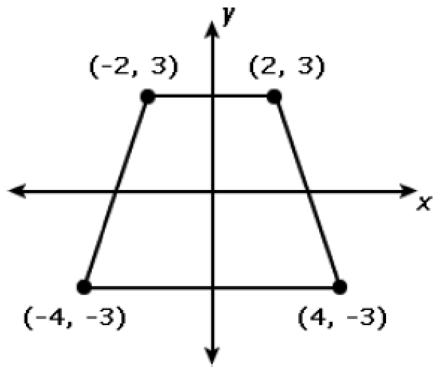
   When ABCD is rotated 90° in a counterclockwise direction about the origin, its image is quadrilateral A' B 'C 'D'. Is distance preserved under this rotation, and which coordinates are correct for the given vertex?

   A. No and $C'(1,2)$
   B. No and $D'(2,4)$
   C. Yes and $A'(6,2)$
   D. Yes and $B'(-3,4)$

MAFS.912.G-CO.1.3 EOC Practice

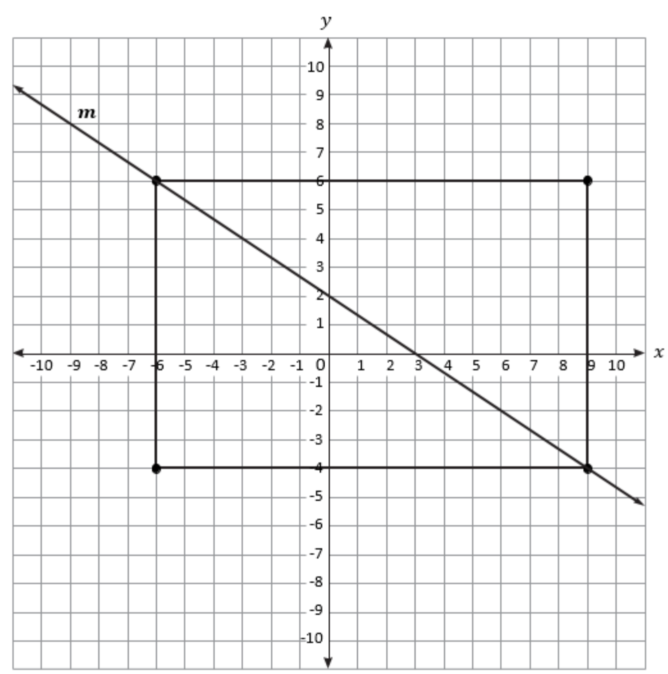
Level 2	Level 3	Level 4	Level 5
chooses a sequence of two transformations that will carry a given figure onto itself or onto another figure	uses transformations that will carry a given figure onto itself or onto another figure	uses algebraic descriptions to describe rotations and/or reflections that will carry a figure onto itself or onto another figure	applies transformations that will carry a figure onto another figure or onto itself, given coordinates of the geometric figure in the stem

1. Which transformation will place the trapezoid onto itself?



A. counterclockwise rotation about the origin by 90°
B. rotation about the origin by 180°
C. reflection across the x-axis
D. reflection across the y-axis

2. Which transformation will carry the rectangle shown below onto itself?

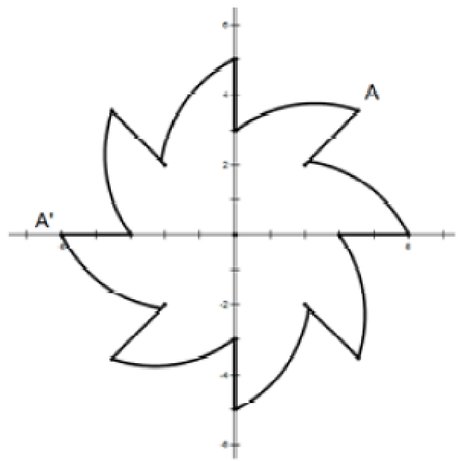


A. a reflection over line m
B. a reflection over the line $y = 1$
C. a rotation 90° counterclockwise about the origin
D. a rotation 270° counterclockwise about the origin

3. Which figure has $90°$ rotational symmetry?

   A. Square
   B. regular hexagon
   C. regular pentagon
   D. equilateral triang

4. Determine the angle of rotation for A to map onto A'.



   A. $45°$
   B. $90°$
   C. $135°$
   D. $180°$

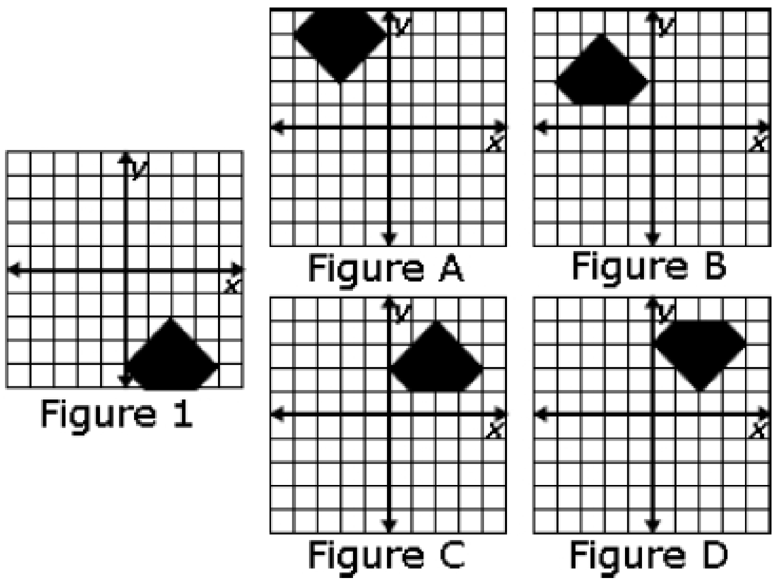
5. Which regular polygon has a minimum rotation of $45°$ to carry the polygon onto itself?

   A. octagon
   B. decagon
   C. decagon
   D. pentagon

MAFS.912.G-CO.2.6 EOC Practice

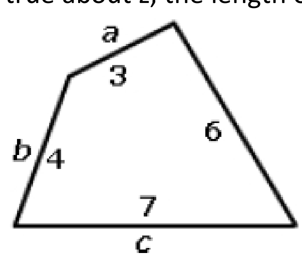
Level 2	Level 3	Level 4	Level 5
determines if a sequence of transformations will result in congruent figures	uses the definition of congruence in terms of rigid motions to determine if two figures are congruent; uses rigid motions to transform figures	explains that two figures are congruent using the definition of congruence based on rigid motions	[intentionally left blank]

1. Figure 1 is reflected about the x-axis and then translated four units left. Which figure results?



   A. Figure A
   B. Figure B
   C. Figure C
   D. Figure D

2. It is known that a series of rotations, translations, and reflections superimposes sides a, b, and c of Quadrilateral X onto three sides of Quadrilateral Y. Which is true about z, the length of the fourth side of Quadrilateral Y?



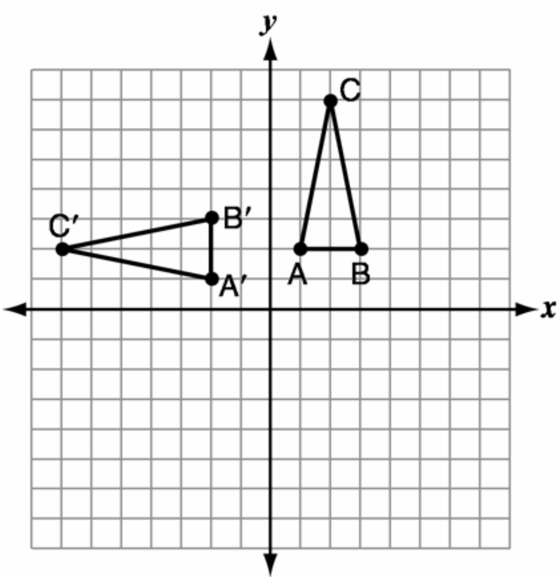
   A. It must be equal to 6
   B. It can be any number in the range $5 \leq z \leq 7$
   C. It can be any number in the range $3 \leq z \leq 8$
   D. It can be any number in the range $0 < z < 14$

3. Which transformation will always produce a congruent figure?

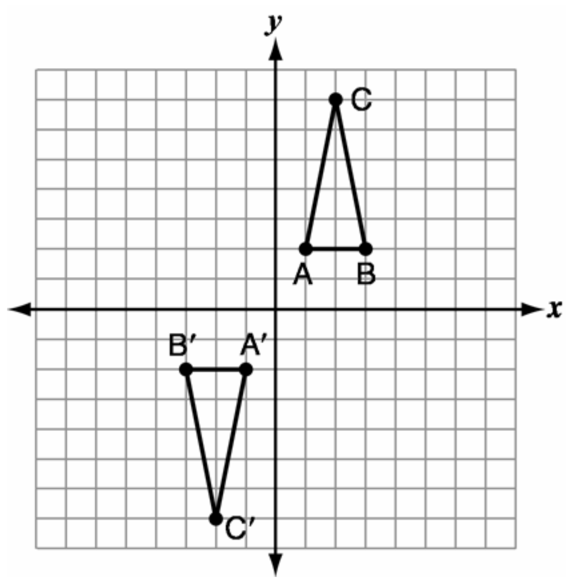
   E. $(x', y') \rightarrow (x + 4, y - 3)$
   F. $(x', y') \rightarrow (2x, y)$
   G. $(x', y') \rightarrow (x + 2, 2y)$
   H. $(x', y') \rightarrow (2x, 2y)$

4. Triangle ABC is rotated 90 degrees clockwise about the origin onto triangle A'B'C'. Which illustration represents the correct position of triangle $A'B'C'$?

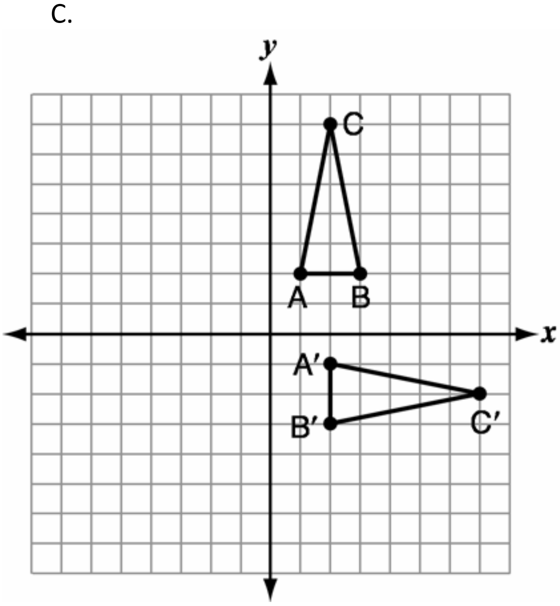
A.



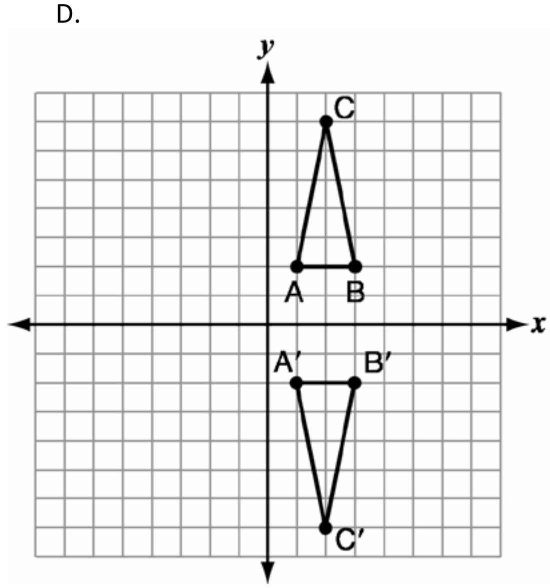
B.



C.



D.



5. The vertices of ΔJKL have coordinates $J(5,1)$, $K(-2,-3)$, and $L(-4,1)$. Under which transformation is the image $\Delta J'K'L'$ NOT congruent to ΔJKL?

   A. a translation of two units to the right and two units down
   B. a counterclockwise rotation of 180 degrees around the origin
   C. a reflection over the x −axis
   D. a dilation with a scale factor of 2 and centered at the origin

6. Prove that the triangles with the given vertices are congruent.
   $A(3,1), B(4,5), C(2,3)$

   $D(-1,-3), E(-5,-4), F(-3,-2)$

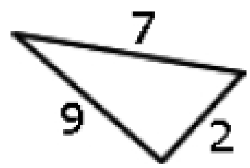
A. The triangles are congruent because ΔABC can be mapped onto ΔDEF by a rotation: $(x,y) \rightarrow (y,-x)$, followed by a reflection: $(x,y) \rightarrow (x,-y)$.
B. The triangles are congruent because ΔABC can be mapped onto ΔDEF by a reflection: $(x,y) \rightarrow (-x,y)$, followed by a rotation: $(x,y) \rightarrow (y,-x)$.
C. The triangles are congruent because ΔABC can be mapped onto ΔDEF by a translation: $(x,y) \rightarrow (x-4,y)$, followed by another translation: $(x,y) \rightarrow (x,y-6)$.
D. The triangles are congruent because ΔABC can be mapped onto ΔDEF by a rotation: $(x,y) \rightarrow (-y,x)$, followed by a reflection: $(x,y) \rightarrow (x,-y)$.

MAFS.912.G-CO.2.7 EOC Practice

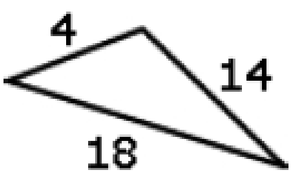
Level 2	Level 3	Level 4	Level 5
identifies corresponding parts of two congruent triangles	shows that two triangles are congruent if and only if corresponding pairs of sides and corresponding pairs of angles are congruent using the definition of congruence in terms of rigid motions; applies congruence to solve problems; uses rigid motions to show ASA, SAS, SSS, or HL is true for two triangles	shows and explains, using the definition of congruence in terms of rigid motions, the congruence of two triangles; uses algebraic descriptions to describe rigid motion that will show ASA, SAS, SSS, or HL is true for two triangles	justifies steps of a proof given algebraic descriptions of triangles, using the definition of congruence in terms of rigid motions that the triangles are congruent using ASA, SAS, SSS, or HL

1. The triangle below can be subject to reflections, rotations, or translations. With which of the triangles can it coincide after a series of these transformations?

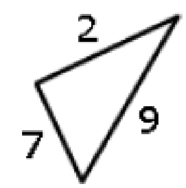
Figures are not necessarily drawn to scale.



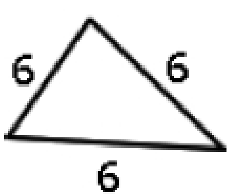
A.



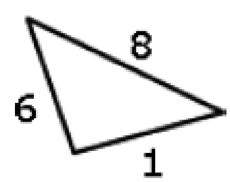
B.



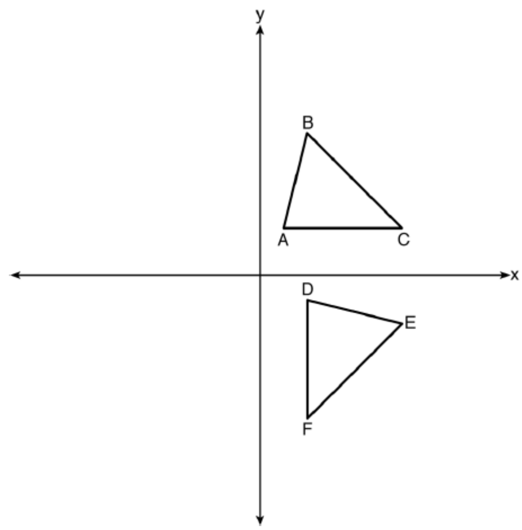
C.



D.



2. The image of ΔABC after a rotation of 90° clockwise about the origin is ΔDEF, as shown below.



Which statement is true?

A. $\overline{BC} \cong \overline{DE}$
B. $\overline{AB} \cong \overline{DF}$
C. $\angle C \cong \angle E$
D. $\angle A \cong \angle D$

3. If $\Delta ABC \cong \Delta DEF$, which segment is congruent to $\overline{AC}$?

A. $\overline{DE}$
B. $\overline{EF}$
C. $\overline{DF}$
D. $\overline{AB}$

4. If $\Delta TRI \cong \Delta ANG$, which of the following congruence statements are true?

- ☐ $\overline{TR} \cong \overline{AN}$
- ☐ $\overline{TI} \cong \overline{AG}$
- ☐ $\overline{RI} \cong \overline{NG}$
- ☐ $\overline{TI} \cong \overline{NA}$
- ☐ $\angle T \cong \angle A$
- ☐ $\angle R \cong \angle N$
- ☐ $\angle I \cong \angle G$
- ☐ $\angle A \cong \angle N$

MAFS.912.G-CO.2.8 EOC Practice

Level 2	Level 3	Level 4	Level 5
identifies corresponding parts of two congruent triangles	shows that two triangles are congruent if and only if corresponding pairs of sides and corresponding pairs of angles are congruent using the definition of congruence in terms of rigid motions; applies congruence to solve problems; uses rigid motions to show ASA, SAS, SSS, or HL is true for two triangles	shows and explains, using the definition of congruence in terms of rigid motions, the congruence of two triangles; uses algebraic descriptions to describe rigid motion that will show ASA, SAS, SSS, or HL is true for two triangles	justifies steps of a proof given algebraic descriptions of triangles, using the definition of congruence in terms of rigid motions that the triangles are congruent using ASA, SAS, SSS, or HL

1. Given the information regarding triangles ABC and DEF, which statement is true?

$$\angle A \cong \angle D$$

$$\angle B \cong \angle E$$

$$\overline{BC} \cong \overline{EF}$$

   A. The given information matches the SAS criterion; the triangles are congruent.
   B. The given information matches the ASA criterion; the triangles are congruent.
   C. Angles C and F are also congruent; this must be shown before using the ASA criterion.
   D. It cannot be shown that the triangles are necessarily congruent.

2. Zhan cut a drinking straw into three pieces (shown below) to investigate a triangle postulate. He moves the straw pieces to make triangles that have been translated, rotated, and reflected from an original position. The end of one piece is always touching the end of another piece. Which postulate could Zhan be investigating using only these straw pieces and no other tools?

(Note: Not to scale.)

   A. The sum of the measures of the interior angles of all triangles is 180°.
   B. If three sides of one triangle are congruent to three sides of a second triangle then, the triangles are congruent.
   C. The sum of the squares of the lengths of the two shorter sides of a triangle is equal to the square of the length of the longest side of a triangle.
   D. If two sides and the included angle of one triangle are congruent to two sides and the included angle of a second triangle, then the triangles are congruent.

3. Consider ΔABC that has been transformed through rigid motions and its image is compared to ΔXYZ. Determine if the given information is sufficient to draw the provided conclusion. Explain your answers.

Given	Conclusion
$\angle A \cong \angle X$ $\angle B \cong \angle Y$ $\angle C \cong \angle Z$	$\Delta ABC \cong \Delta XYZ$

O TRUE O FALSE

Given	Conclusion
$\angle A \cong \angle X$ $\angle B \cong \angle Y$ $\overline{BC} \cong \overline{YZ}$	$\Delta ABC \cong \Delta XYZ$

O TRUE O FALSE

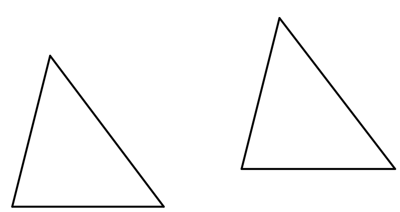
Given	Conclusion
$\angle A \cong \angle X$ $\overline{AB} \cong \overline{XY}$ $\overline{BC} \cong \overline{YZ}$	$\Delta ABC \cong \Delta XYZ$

O TRUE O FALSE

4. For two isosceles right triangles, what is **not** enough information to prove congruence?

A. The lengths of all sides of each triangle.
B. The lengths of the hypotenuses for each triangle.
C. The lengths of a pair of corresponding legs.
D. The measures of the non-right angles in each triangle.

5. For two triangles with identical orientation, what rigid motion is necessary for SAS congruence to be shown?

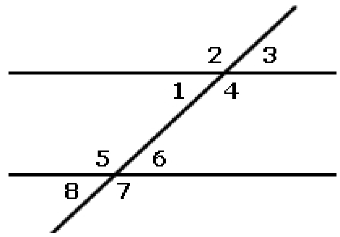


A. Translation
B. Rotation
C. Reflection
D. Dilation

MAFS.912.G-CO.3.9 EOC Practice

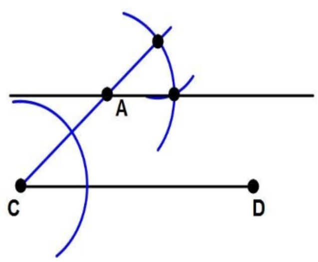
Level 2	Level 3	Level 4	Level 5
uses theorems about parallel lines with one transversal to solve problems; uses the vertical angles theorem to solve problems	completes no more than two steps of a proof using theorems about lines and angles; solves problems using parallel lines with two to three transversals; solves problems about angles using algebra	completes a proof for vertical angles are congruent, alternate interior angles are congruent, and corresponding angles are congruent	creates a proof, given statements and reasons, for points on a perpendicular bisector of a line segment are exactly those equidistant from the segment's endpoints

1. Which statements should be used to prove that the measures of angles 1 and 5 sum to 180°?



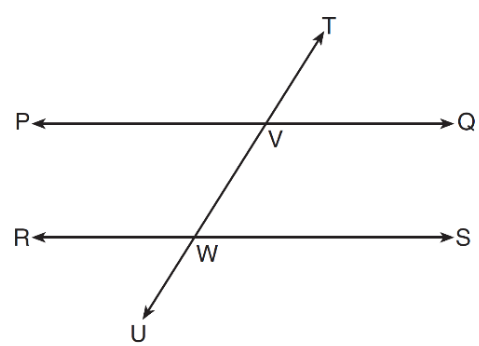
A. Angles 1 and 8 are congruent as corresponding angles; angles 5 and 8 form a linear pair.
B. Angles 1 and 2 form a linear pair; angles 3 and 4 form a linear pair.
C. Angles 5 and 7 are congruent as vertical angles; angles 6 and 8 are congruent as vertical angles.
D. Angles 1 and 3 are congruent as vertical angles; angles 7 and 8 form a linear pair.

2. Which statement justifies why the constructed line passing through the given point A is parallel to $\overline{CD}$?



A. When two lines are each perpendicular to a third line, the lines are parallel.
B. When two lines are each parallel to a third line, the lines are parallel.
C. When two lines are intersected by a transversal and alternate interior angles are congruent, the lines are parallel.
D. When two lines are intersected by a transversal and corresponding angles are congruent, the lines are parallel.

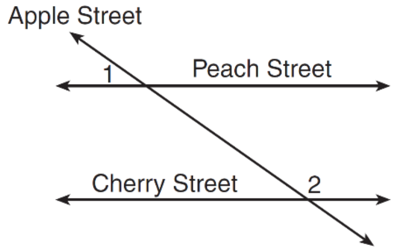
3. In the diagram below, transversal $\overleftrightarrow{TU}$ intersects $\overleftrightarrow{PQ}$ and $\overleftrightarrow{RS}$ at V and W, respectively.



If $m\angle TVQ = 5x - 22$ and $m\angle TVQ = 3x + 10$, for which value of x is $\overleftrightarrow{PQ} \parallel \overleftrightarrow{RS}$, ?

A. 6
B. 16
C. 24
D. 28

4. Peach Street and Cherry Street are parallel. Apple Street intersects them, as shown in the diagram below.



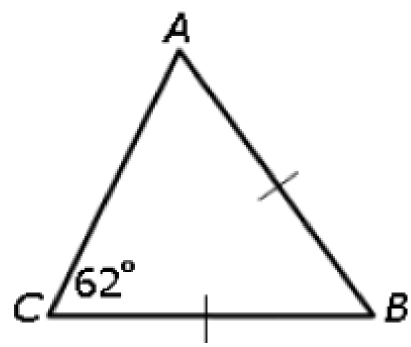
If $m\angle 1 = 2x + 36$ and $m\angle 2 = 7x - 9$, what is $m\angle 1$?

A. 9
B. 17
C. 54
D. 70

MAFS.912.G-CO.3.10 EOC Practice

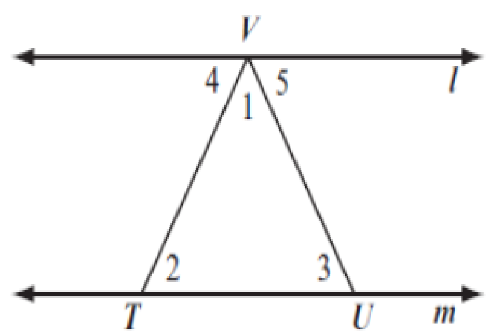
Level 2	Level 3	Level 4	Level 5
uses theorems about interior angles of a triangle, exterior angle of a triangle	completes no more than two steps in a proof using theorems (measures of interior angles of a triangle sum to 180,; base angles of isosceles triangles are congruent, the segment joining midpoints of two sides of a triangle is parallel to the third side and half the length) about triangles; solves problems about triangles using algebra; solves problems using the triangle inequality and the Hinge theorem	completes a proof for theorems about triangles; solves problems by applying algebra using the triangle inequality and the Hinge theorem; solves problems for the midsegment of a triangle, concurrency of angle bisectors, and concurrency of perpendicular bisectors	completes proofs using the medians of a triangle meet at a point; solves problems by applying algebra for the midsegment of a triangle, concurrency of angle bisectors, and concurrency of perpendicular bisectors

1. What is the measure of $\angle B$ in the figure below?



   A. 62°
   B. 58°
   C. 59°
   D. 56°

2. In this figure, $\boldsymbol{l} \| \boldsymbol{m}$. Jessie listed the first two steps in a proof that $\angle\mathbf{1} + \angle\mathbf{2} + \angle\mathbf{3} = \mathbf{180°}$.



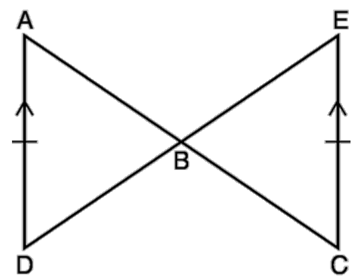
	Step	Justification
1	$\angle 2 \cong \angle 4$	?
2	$\angle 3 \cong \angle 5$	?

Which justification can Jessie give for Steps 1 and 2?

   A. Alternate interior angles are congruent.
   B. Corresponding angles are congruent.
   C. Vertical angles are congruent.
   D. Alternate exterior angles are congruent.

3. Given: $\overline{AD} \parallel \overline{EC}$, $\overline{AD} \cong \overline{EC}$

   Prove: $\overline{AB} \cong \overline{CB}$



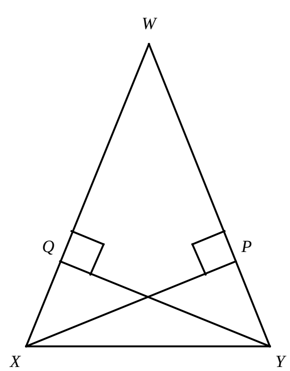
Shown below are the statements and reasons for the proof. They are not in the correct order.

Statement	Reason
I. $\triangle ABD \cong \triangle CBE$	I. AAS
II. $\angle ABD \cong \angle EBC$	II. Vertical angles are congruent.
III. $\overline{AD} \parallel \overline{EC}$, $\overline{AD} \cong \overline{EC}$	III. Given
IV. $\overline{AB} \cong \overline{CB}$	IV. Corresponding parts of congruent triangles are congruent.
V. $\angle DAB \cong \angle ECB$	V. If two parallel lines are cut by a transversal, the alternate interior angles are congruent.

Which of these is the most logical order for the statements and reasons?

A. I, II, III, IV, V
B. III, II, V, I, IV
C. III, II, V, IV, I
D. II, V, III, IV, I

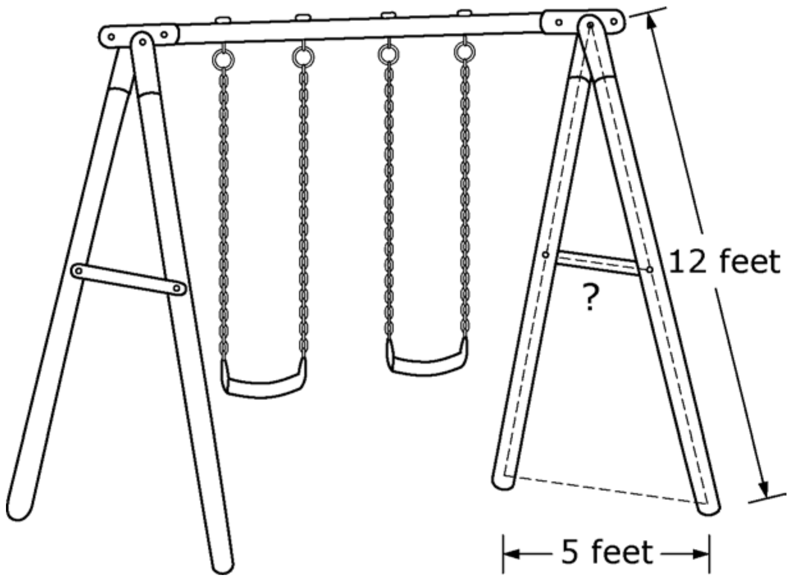
4. $\overline{YQ}$ and $\overline{XP}$ are altitudes to the congruent sides of isosceles triangle WXY.



Keisha is going to prove $\overline{YQ} \cong \overline{XP}$ by showing they are congruent parts of the congruent triangles QXY and PYX.

A. AAS - because triangle WXY is isosceles, its base angles are congruent. Perpendicular lines form right angles, which are congruent; and segment $\overline{XY}$ is shared.
B. SSS - because segment $\overline{QP}$ would be parallel to segment $\overline{XY}$.
C. SSA - because segment $\overline{XY}$ is shared; segments $\overline{XP}$ and $\overline{YQ}$ are altitudes, and WXY is isosceles, so base angles are congruent.
D. ASA - because triangle WXY is isosceles, its base angles are congruent. Segment $\overline{XY}$ is shared; and perpendicular lines form right angles, which are congruent.

5. The figure above represents a swing set. The supports on each side of the swing set are constructed from two 12-foot poles connected by a brace at their midpoint. The distance between the bases of the two poles is 5 feet.



Part A
What is the length of each brace?

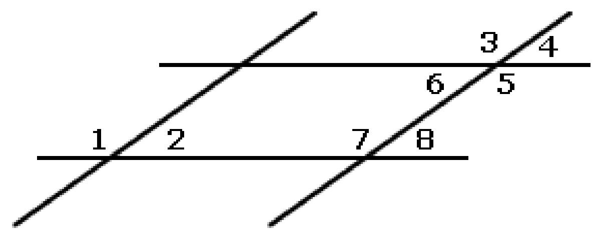
Part B
Which theorem about triangles did you apply to find the solution in Part A?

MAFS.912.G-CO.3.11 EOC Practice

Level 2	Level 3	Level 4	Level 5
uses properties of parallelograms to find numerical values of a missing side or angle or select a true statement about a parallelogram	completes no more than two steps in a proof for opposite sides of a parallelogram are congruent and opposite angles of a parallelogram are congruent; uses theorems about parallelograms to solve problems using algebra	creates proofs to show the diagonals of a parallelogram bisect each other, given statements and reasons	proves that rectangles and rhombuses are parallelograms, given statements and reasons

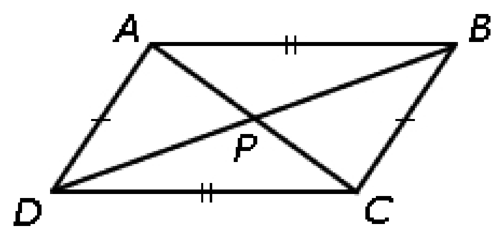
1. Two pairs of parallel line form a parallelogram. Becki proved that angles 2 and 6 are congruent. She is first used corresponding angles created by a transversal and then alternate interior angles. Which pairs of angles could she use?

   A. 1 and 2 then 5 and 6
   B. 4 and 2 then 4 and 6
   C. 7 and 2 then 7 and 6
   D. 8 and 2 then 8 and 6



2. To prove that diagonals of a parallelogram bisect each other, Xavier first wants to establish that triangles APD and CPB are congruent. Which criterion and elements can he use?

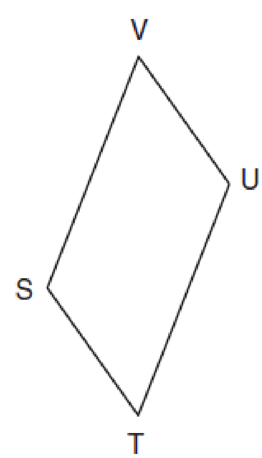
   A. SAS: sides AP & PD and CP & PB with the angles in between
   B. SAS: sides AD & AP and CB & CP with the angles in between
   C. ASA: sides DP and PB with adjacent angles
   D. ASA: sides AD and BC with adjacent angles



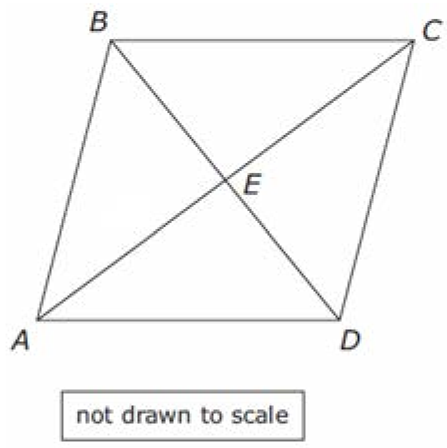
3. In the diagram below of parallelogram $STUV$, $SV = x + 3$, $VU = 2x - 1$, and $TU = 4x - 3$.

   What is the length of $\overline{SV}$?

   A. 2
   B. 4
   C. 5
   D. 7



4. The figure shows parallelogram $ABCD$ with $AE = 18$.



Let $BE = x^2 - 48$ and let $= 2x$. What are the lengths of $\overline{BE}$ and $\overline{DE}$?

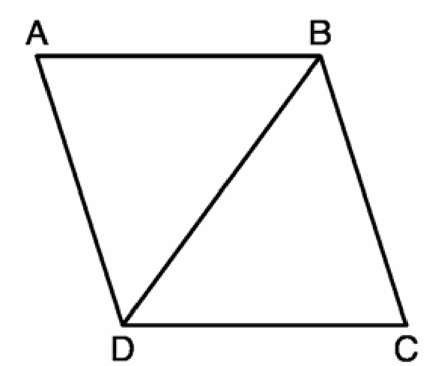
$\overline{BE} =$ ☐

$\overline{DE} =$ ☐

5. Ms. Davis gave her students all the steps of the proof below. One step is not needed.

Given: $ABCD\ is\ a\ parallelogram$

Prove: $\Delta ABD \cong \Delta CDB$

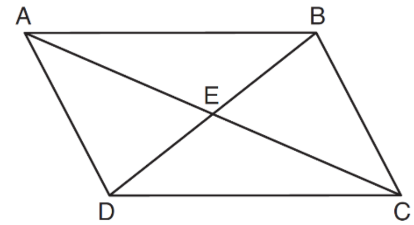


Statements	Reasons
1. ▱ABCD is a parallelogram.	1. Given
2. $\overline{AB} \cong \overline{DC}$ $\overline{AD} \cong \overline{BC}$	2. Opposite sides of a parallelogram are ≅.
3. $\angle A \cong \angle C$	3. Opposite angles of a parallelogram are ≅.
4. $\overline{BD} \cong \overline{BD}$	4. Reflexive property of congruence
5. $\triangle ABD \cong \triangle CDB$	5. SSS

Which step is not necessary to complete this proof?

A. Step 1
B. Step 2
C. Step 3
D. Step 4

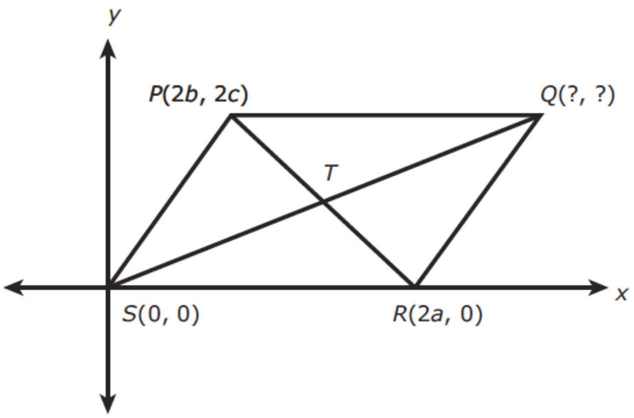
6. Given: Quadrilateral $ABCD$ is a parallelogram with diagonals $\overline{AC}$ and $\overline{BD}$ intersecting at E



Prove: $\Delta AED \cong \Delta CEB$

Describe a single rigid motion that maps ΔAED onto ΔCEB .

7. The figure shows parallelogram PQRS on a coordinate plane. Diagonals $\overline{SQ}$ and $\overline{PR}$ intersect at point T.

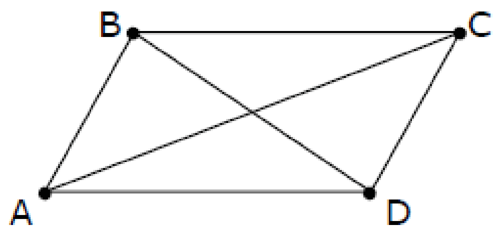


Part A
Find the coordinates of point Q in terms of a, b, and c.

$Q(\quad,\quad)$

Part B
Since $PQRS$ is a parallelogram, $\overline{SQ}$ and $\overline{PR}$ bisect each other. Use the coordinates to verify that $\overline{SQ}$ and $\overline{PR}$ bisect each other.

8. Missy is proving the theorem that states that opposite sides of a parallelogram are congruent.



Missy is proving the theorem that states that opposite sides of a parallelogram are congruent.

Given: Quadrilateral ABCD is a parallelogram. Prove: $\overline{AB} \cong \overline{CD}$ and $\overline{BC} \cong \overline{DA}$

Missy's incomplete proof is shown.

Statement		Reason	
1.	Quadrilateral ABCD is a parallelogram.	1.	given
2.	$\overline{AB} \parallel \overline{CD}$; $\overline{BC} \parallel \overline{DA}$	2.	definition of parallelogram
3.	?	3.	?
4.	$\overline{AC} \cong \overline{AC}$	4.	reflexive property
5.	$\Delta ABC \cong \Delta CDA$	5.	angle-side-angle congruence postulate
6.	$\overline{AB} \cong \overline{CD}$ and $\overline{BC} \cong \overline{DA}$	6.	Corresponding parts of congruent triangles are congruent (CPCTC).

Which statement and reason should Missy insert into the chart as step 3 to complete the proof?

A. $\overline{BD} \cong \overline{BD}$; reflexive property

B. $\overline{AB} \cong \overline{CD}$ and $\overline{BC} \cong \overline{DA}$; reflexive property

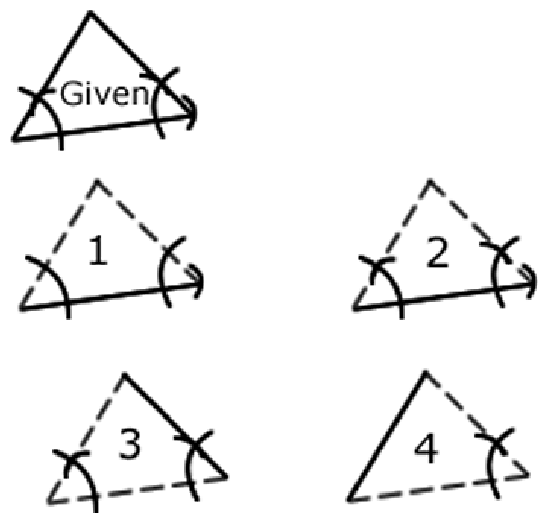
C. $\angle ABD \cong \angle CDB$ and $\angle ADB \cong \angle CBD$; When parallel lines are cut by a transversal, alternate interior angles are congruent.

D. $\angle BAC \cong \angle DCA$ and $\angle BCA \cong \angle DAC$; When parallel lines are cut by a transversal, alternate interior angles are congruent.

MAFS.912.G-CO.4.12 EOC Practice

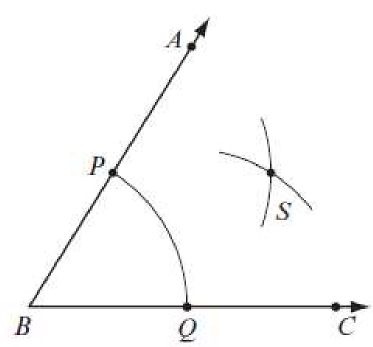
Level 2	Level 3	Level 4	Level 5
chooses a visual or written step in a construction	identifies, sequences, or reorders steps in a construction: copying a segment, copying an angle, bisecting a segment, bisecting an angle, constructing perpendicular lines, including the perpendicular bisector of a line segment, and constructing a line parallel to a given line through a point not on the line	identifies sequences or reorders steps in a construction of an equilateral triangle, a square, and a regular hexagon inscribed in a circle	explains steps in a construction

1. Which triangle was constructed congruent to the given triangle?



A. Triangle 1
B. Triangle 2
C. Triangle 3
D. Triangle 4

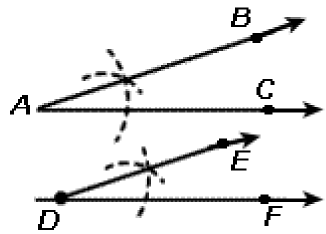
2. A student used a compass and a straightedge to bisect ∠ABC in this figure.



Which statement BEST describes point S?

A. Point S is located such that SC = PQ.
B. Point S is located such that SA = PQ.
C. Point S is located such that PS = BQ.
D. Point S is located such that QS = PS.

3. What is the first step in constructing congruent angles?

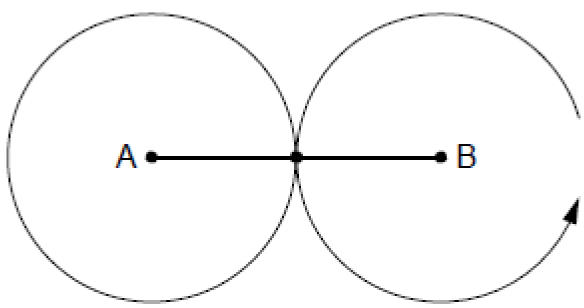


A. Draw ray DF.
B. From point A, draw an arc that intersects the sides of the angle at point B and C.
C. From point D, draw an arc that intersects the sides of the angle at point E and F.
D. From points A and D, draw equal arcs that intersects the rays AC and DF.

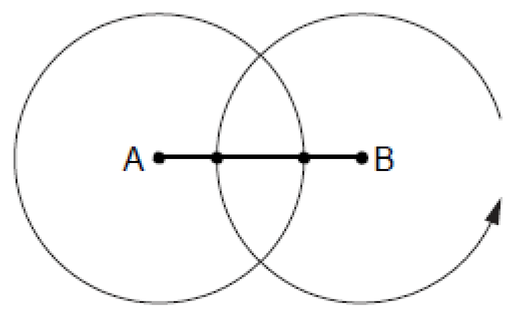
4. Melanie wants to construct the perpendicular bisector of line segment AB using a compass and straightedge.

Which diagram shows the first step(s) of the construction?

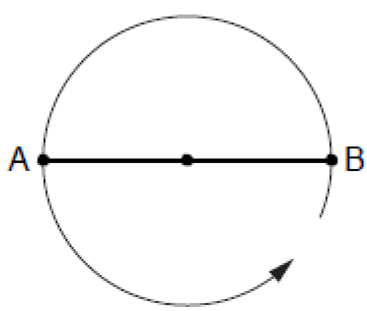
A.



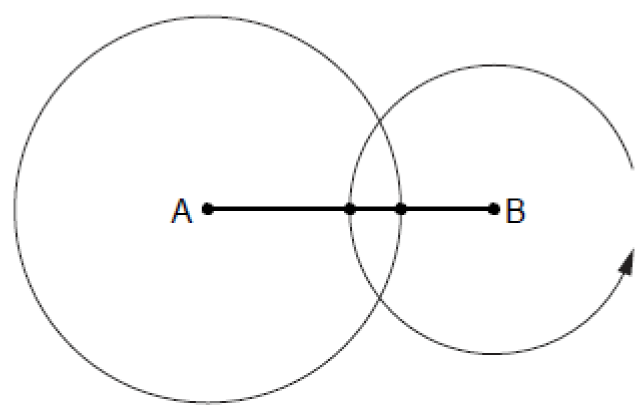
B.



C.



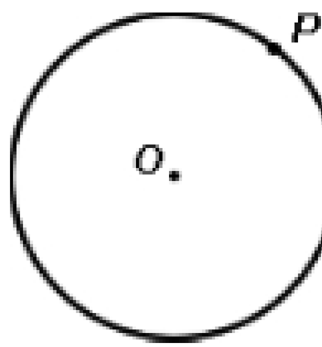
D.



MAFS.912.G-CO.4.13 EOC Practice

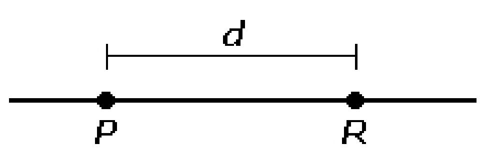
Level 2	Level 3	Level 4	Level 5
chooses a visual or written step in a construction	identifies, sequences, or reorders steps in a construction: copying a segment, copying an angle, bisecting a segment, bisecting an angle, constructing perpendicular lines, including the perpendicular bisector of a line segment, and constructing a line parallel to a given line through a point not on the line	identifies sequences or reorders steps in a construction of an equilateral triangle, a square, and a regular hexagon inscribed in a circle	explains steps in a construction

1. The radius of circle O is r. A circle with the same radius drawn around P intersects circle O at point R. What is the measure of angle ROP?



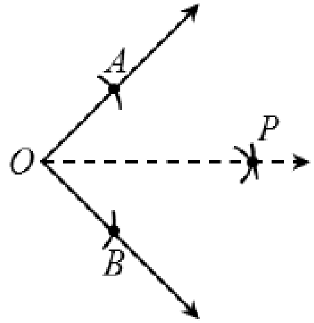
A. 30°
B. 60°
C. 90°
D. 120°

2. Carol is constructing an equilateral triangle with P and R being two of the vertices. She is going to use a compass to draw circles around P and R. What should the radius of the circles be?



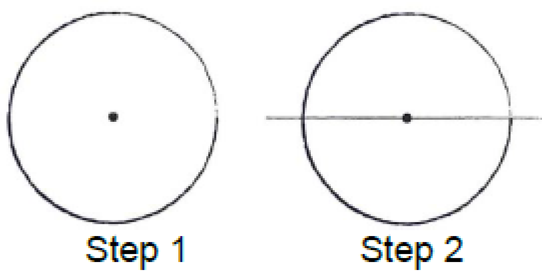
A. d
B. $2d$
C. $\frac{d}{2}$
D. d^2

3. The figure below shows the construction of the angle bisector of $\angle AOB$ using a compass. Which of the following statements must always be true in the construction of the angle bisector? Select **Yes** or **No** for each statement.



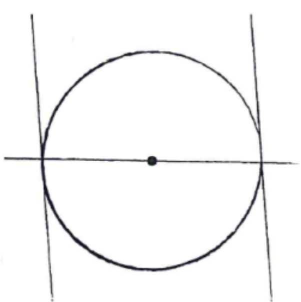
$OA = OB$	O YES	O NO
$AP = BP$	O YES	O NO
$AB = BP$	O YES	O NO
$OB = BP$	O YES	O NO

4. Daya is drawing a square inscribed in a circle using a compass and a straightedge. Her first two steps are shown.

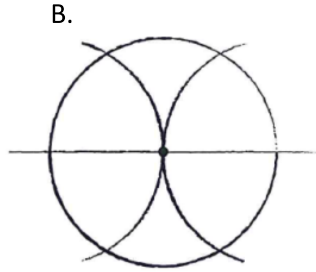


Which is the best step for Daya to do next?

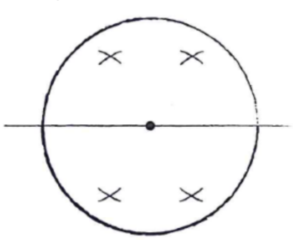
A.



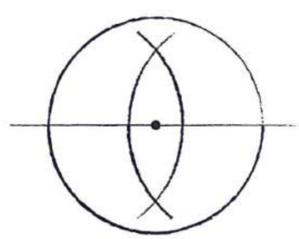
B.



C.



D.



5. Carolina wanted to construct a polygon inscribed in a circle by paper folding. She completed the following steps:

   - Start with a paper circle. Fold it in half. Make a crease.
   - Take the half circle and fold it in thirds. Crease along the sides of the thirds.
   - Open the paper. Mark the intersection points of the creases with the circle.
   - Connect adjacent intersection points on the circle with segments.

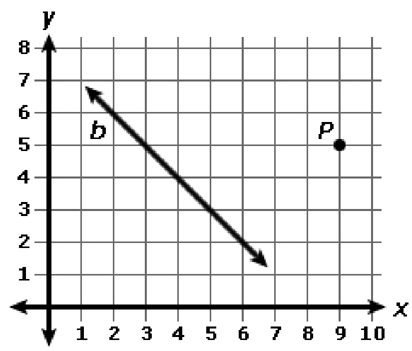
   Which polygon was Carolina most likely trying to construct?

   A. Regular nonagon
   B. Regular octagon
   C. Regular hexagon
   D. Regular pentagon

MAFS.912.G-SRT.1.1 EOC Practice

Level 2	Level 3	Level 4	Level 5
identifies the scale factors of dilations	chooses the properties of dilations when a dilation is presented on a coordinate plane, as a set of ordered pairs, as a diagram, or as a narrative; properties are: 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; the dilation of a line segment is longer or shorter in the ratio given by the scale factor	explains why a dilation takes a line not passing through the center of dilation to a parallel line and leaves a line passing through the center unchanged or that the dilation of a line segment is longer or shorter in ratio given by the scale factor	explains whether a dilation presented on a coordinate plane, as a set of ordered pairs, as a diagram, or as a narrative correctly verifies the properties of dilations

1. Line b is defined by the equation y = 8 - x. If line b undergoes a dilation with a scale factor of 0.5 and center P, which equation will define the image of the line?



A. $y = 4 - x$
B. $y = 5 - x$
C. $y = 8 - x$
D. $y = 11 - x$

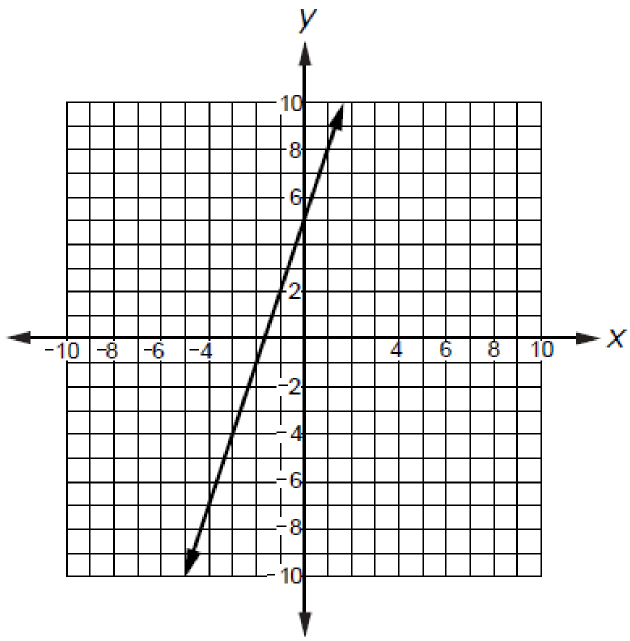
2. GH = 1. A dilation with center H and a scale factor of 0.5 is applied. What will be the length of the image of the segment GH?

A. 0
B. 0.5
C. 1
D. 2

3. The vertices of square $ABCD$ are $A(3,1), B(3,-1), C(5,-1)$, and $D(5,1)$. This square is dilated so that A' is at $(3,1)$ and C' is at $(8,-4)$. What are the coordinates of D'?

A. $(6,-4)$
B. $(6,-4)$
C. $(8,1)$
D. $(8,4)$

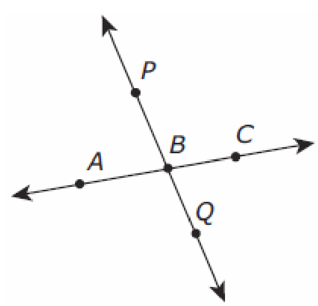
4. Rosa graphs the line $y = 3x + 5$. Then she dilates the line by a factor of $\frac{1}{5}$ with (0, 7) as the center of dilation.



Which statement best describes the result of the dilation?

A. The result is a different line $\frac{1}{5}$ the size of the original line.
B. The result is a different line with a slope of 3.
C. The result is a different line with a slope of $-\frac{1}{3}$.
D. The result is the same line.

5. The figure shows line AC and line PQ intersecting at point B. Lines $A'C'$ and $P'Q'$ will be the images of lines AC and PQ, respectively, under a dilation with center P and scale factor 2.



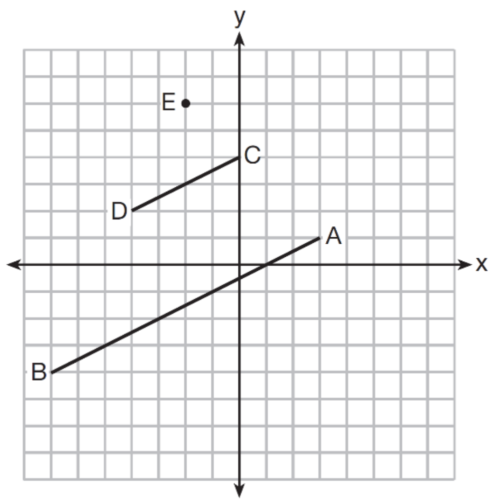
Which statement about the image of lines AC and PQ would be true under the dilation?

A. Line $A'C'$ will be parallel to line AC, and line $P'Q'$ will be parallel to line PQ.
B. Line $A'C'$ will be parallel to line AC, and line $P'Q'$ will be the same line as line PQ.
C. Line $A'C'$ will be perpendicular to line AC, and line $P'Q'$ will be parallel to line PQ.
D. Line $A'C'$ will be perpendicular to line AC, and line $P'Q'$ will be the same line as line PQ.

6. A line that passes through the points whose coordinates are (1,1) and (5,7) is dilated by a scale factor of 3 and centered at the origin. The image of the line

A. is perpendicular to the original line
B. is parallel to the original line
C. passes through the origin
D. is the original line

7. In the diagram below, $\overline{CD}$ is the image of $\overline{AB}$ after a dilation of scale factor k with center E.



Which ratio is equal to the scale factor k of the dilation?

A. $\frac{EC}{EA}$
B. $\frac{BA}{EA}$
C. $\frac{EA}{BA}$
D. $\frac{EA}{EC}$

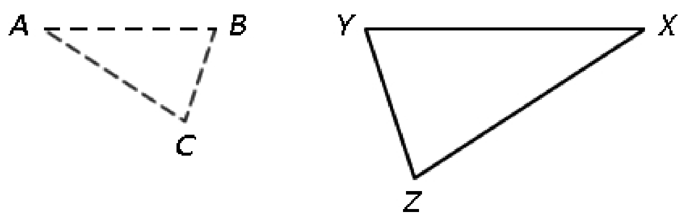
MAFS.912.G-SRT.1.2 EOC Practice

Level 2	Level 3	Level 4	Level 5
determines if two given figures are similar	uses the definition of similarity in terms of similarity transformations to decide if two figures are similar; determines if given information is sufficient to determine similarity	shows that corresponding angles of two similar figures are congruent and that their corresponding sides are proportional	explains using the definition of similarity in terms of similarity transformations that corresponding angles of two figures are congruent and that corresponding sides of two figures are proportional

1. When two triangles are considered similar but not congruent?

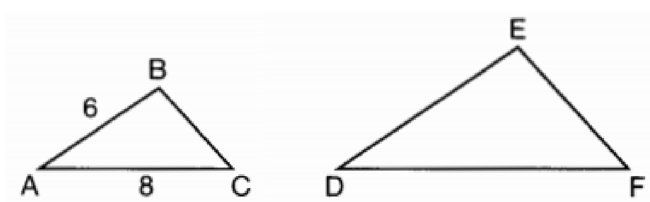
   A. The distance between corresponding vertices are equal.
   B. The distance between corresponding vertices are proportionate.
   C. The vertices are reflected across the x-axis.
   D. Each of the vertices are shifted up by the same amount.

2. Triangle ABC was reflected and dilated so that it coincides with triangle XYZ. How did this transformation affect the sides and angles of triangle ABC?



   A. The side lengths and angle measure were multiplied by $\frac{XY}{AB}$
   B. The side lengths were multiplied by $\frac{XY}{AB}$, while the angle measures were preserved
   C. The angle measures were multiplied by $\frac{XY}{AB}$, while the side lengths were preserved
   D. The angle measures and side lengths were preserved

3. In the diagram below, $\Delta ABC \sim \Delta DEF$.



   If $AB = 6$ and $AC = 8$, which statement will justify similarity by SAS?

   A. $DE = 9$, $DF = 12$, and $\angle A \cong \angle D$
   B. $DE = 8$, $DF = 10$, and $\angle A \cong \angle D$
   C. $DE = 36$, $DF = 64$, and $\angle C \cong \angle LF$
   D. $DE = 15$, $DF = 20$, and $\angle C \cong \angle LF$

4. Kelly dilates triangle ABC using point P as the center of dilation and creates triangle $A'B'C'$.
By comparing the slopes of AC and CB and $A'C'$ and $C'B'$, Kelly found that $\angle ACB$ and $\angle A'C'B'$ are right angles.

Which set of calculations could Kelly use to prove ΔABC is similar to $\Delta A'B'C'$?

A.

$$\text{slope AB} = \frac{7-(-7)}{2-(-5)} = \frac{14}{7} = 2$$

$$\text{slope A'B'} = \frac{7-3}{-3-(-5)} = \frac{4}{2} = 2$$

B.

$$AB^2 = 7^2 + 14^2$$

$$A'B'^2 = 2^2 + 4^2$$

C.

$$\tan\angle ABC = \frac{AC}{BC} = \frac{7}{14}$$

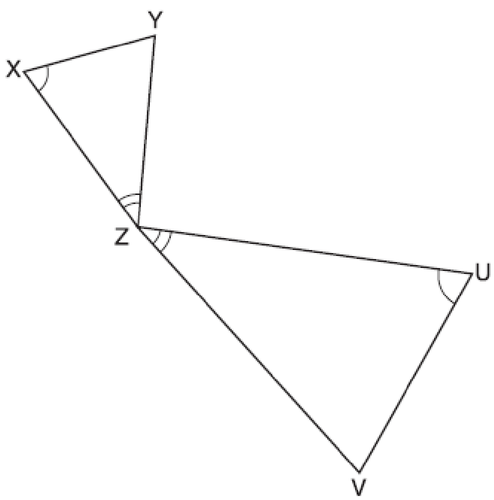
$$\tan\angle A'B'C' = \frac{A'C'}{B'C'} = \frac{2}{4}$$

D.

$$\angle ABC + \angle BCA + \angle CAB = 180^\circ$$

$$\angle A'B'C' + \angle B'C'A' + \angle C'A'B' = 180^\circ$$

5. In the diagram below, triangles XYZ and UVZ are drawn such that $\angle X \cong \angle U$ and $\angle XZY \cong \angle UZV$.

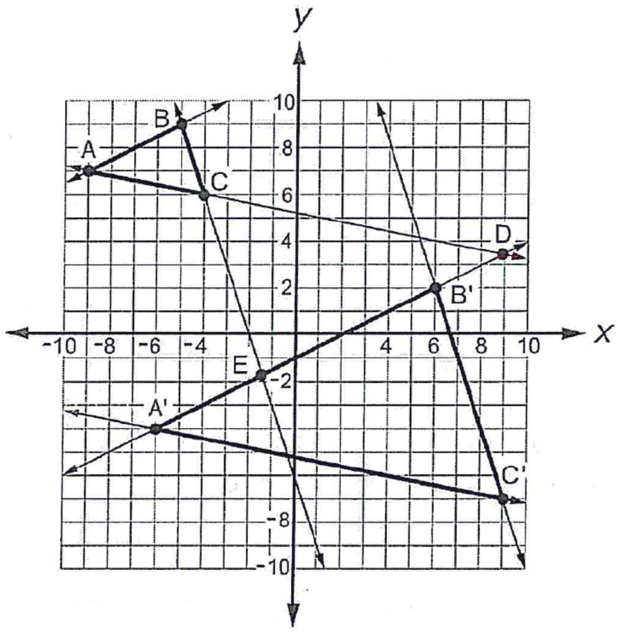


Describe a sequence of similarity transformations that shows ΔXYZ is similar to ΔUVZ.

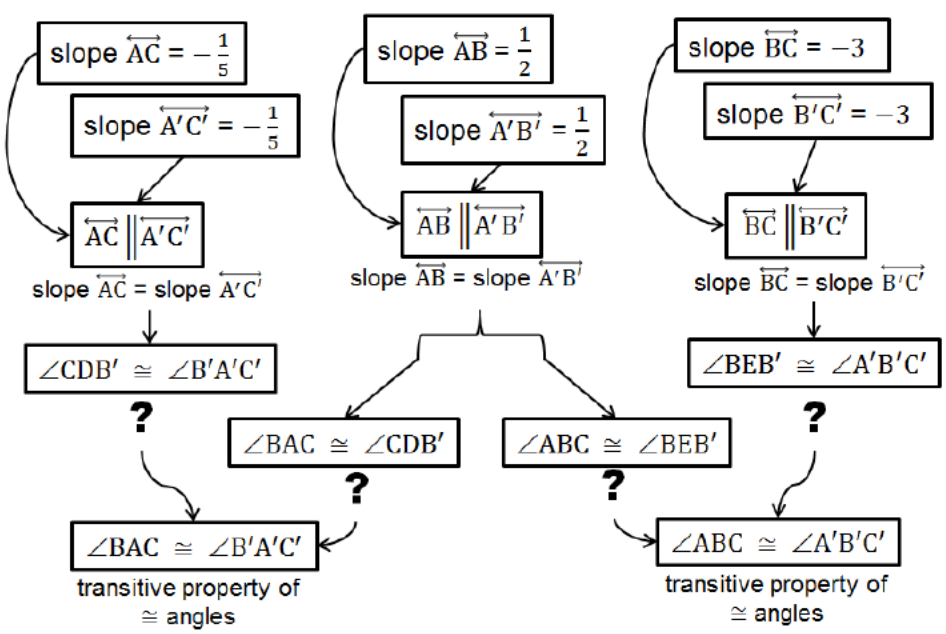
MAFS.912.G-SRT.1.3 EOC Practice

Level 2	Level 3	Level 4	Level 5
identifies that two triangles are similar using the AA criterion	establishes the AA criterion for two triangles to be similar by using the properties of similarity transformations	proves that two triangles are similar if two angles of one triangle are congruent to two angles of the other triangle, using the properties of similarity transformations; uses triangle similarity to prove theorems about triangles	proves the Pythagorean theorem using similarity

1. Kamal dilates triangle ABC to get triangle A'B'C'. He knows that the triangles are similar because of the definition of similarity transformations. He wants to demonstrate the angle-angle similarity postulate by proving ∠BAC ≅∠B'A'C' and ∠ ABC ≅ ∠A'B'C'.



Kamal makes this incomplete flow chart proof.

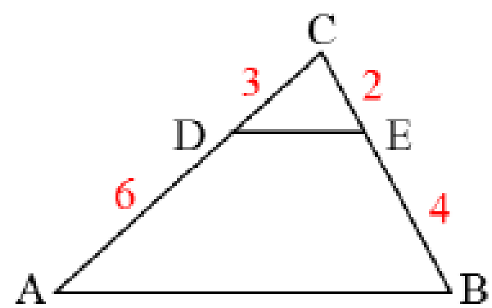


What reason should Kamal add at all of the question marks in order to complete the proof?

A. Two non-vertical lines have the same slope if and only if they are parallel.
B. Angles supplementary to the same angle or to congruent angles are congruent.
C. If two parallel lines are cut by a transversal, then each pair of corresponding angles is congruent.
D. If two parallel lines are cut by a transversal, then each pair of alternate interior angles is congruent.

2. Given: $AD = 6;\ DC = 3;\ BE = 4;\ and\ EC = 2$

Prove: $\Delta CDE \sim \Delta CAB$

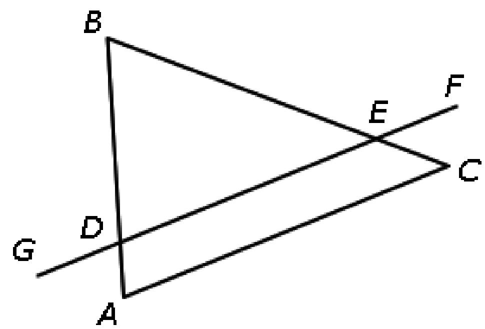


	Statements	Reasons
1.		Given
2.	$CA = CD + DA$ $CB = CE + EB$	
3.	$\frac{CA}{CD} = \frac{9}{3} = 3\,;\frac{CB}{CE} = \frac{6}{2} = 3$	
4.		Transitive Property
5.		
6.	$\Delta CDE \sim \Delta CAB$	

MAFS.912.G-SRT.2.4 EOC Practice

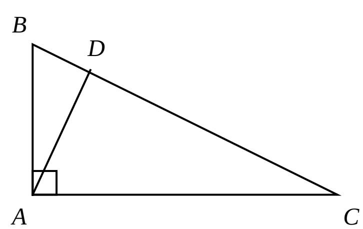
Level 2	Level 3	Level 4	Level 5
identifies that two triangles are similar using the AA criterion	establishes the AA criterion for two triangles to be similar by using the properties of similarity transformations	proves that two triangles are similar if two angles of one triangle are congruent to two angles of the other triangle, using the properties of similarity transformations; uses triangle similarity to prove theorems about triangles	proves the Pythagorean theorem using similarity

1. Lines AC and FG are parallel. Which statement should be used to prove that triangles ABC and DBE are similar?



   A. Angles BDE and BCA are congruent as alternate interior angles.
   B. Angles BAC and BEF are congruent as corresponding angles.
   C. Angles BED and BCA are congruent as corresponding angles.
   D. Angles BDG and BEF are congruent as alternate exterior angles.

2. A diagram from a proof of the Pythagorean Theorem is shown. Which statement would NOT be used in the proof?



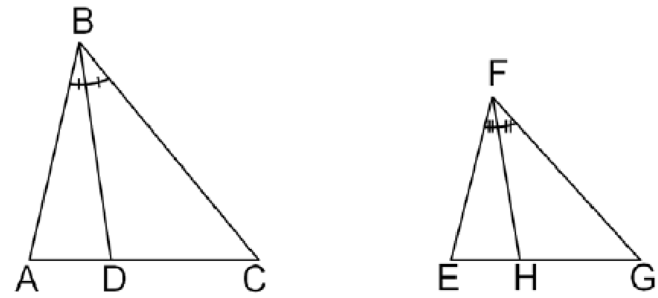
   A. $(AB)^2 + (AC)^2 = (BC)[(BD) + (DC)] \Rightarrow (AB)^2 + (AC)^2 = (BC)$
   B. $\Delta BAC \sim \Delta BDA \sim \Delta ADC$
   C. $\frac{AB}{BC} = \frac{BD}{AB}$ and $\frac{AC}{BC} = \frac{DC}{AC}$
   D. ΔABC is a right triangle with an altitude $\overline{AD}$.

3. Ethan is proving the theorem that states that if two triangles are similar, then the measures of the corresponding angle bisectors are proportional to the measures of the corresponding sides.

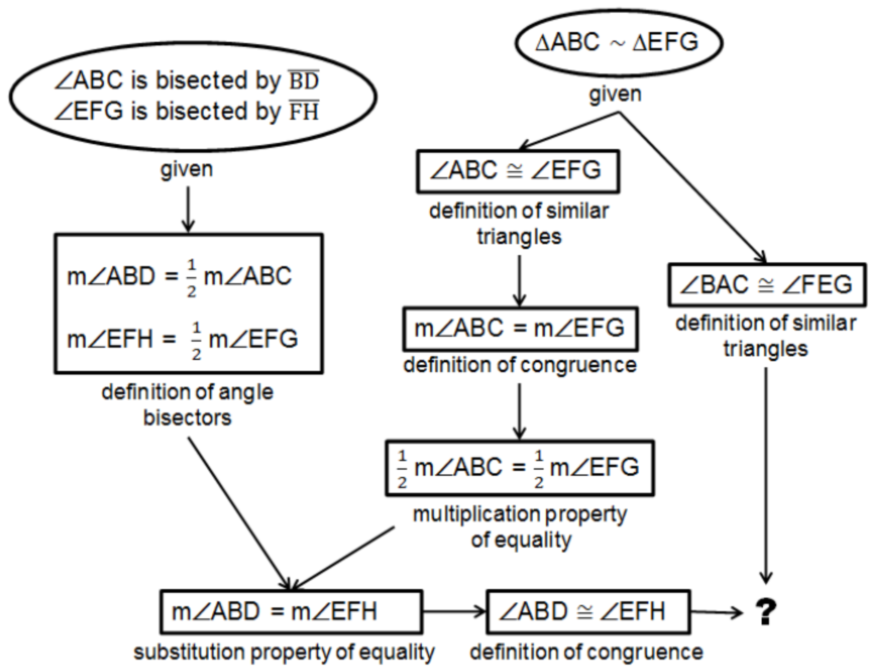
Given: $\Delta ABC \sim \Delta EFG$.

$\overline{BD}$ bisects $\angle ABC$, and $\overline{FH}$ bisects $\angle EFG$.

Prove: $\frac{AB}{EF} = \frac{BD}{FH}$



Ethan's incomplete flow chart proof is shown.



Which statement and reason should Ethan add at the question mark to best continue the proof?

A. $\Delta ABD \sim \Delta EFH$; AA similarity

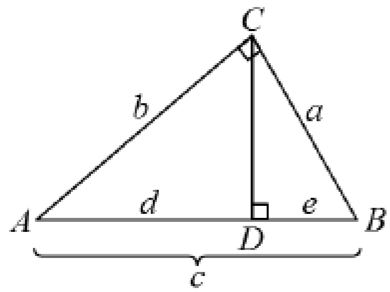
B. $\angle BCA \cong \angle FGE$; definition of similar triangles

C. $\frac{AB}{BC} = \frac{EF}{GH}$; definition of similar triangles

D. $m\angle ADB + m\angle ABD + m\angle BAD = 180°$; $m\angle EFH + m\angle EHF + m\angle FEH = 180°$; Angle Sum Theorem

4. In the diagram, ΔABC is a right triangle with right angle , and $\overline{CD}$ is an altitude of ΔABC.

   Use the fact that $\Delta ABC \sim \Delta ACD \sim \Delta CBD$ to prove $a^2 + b^2 = c^2$

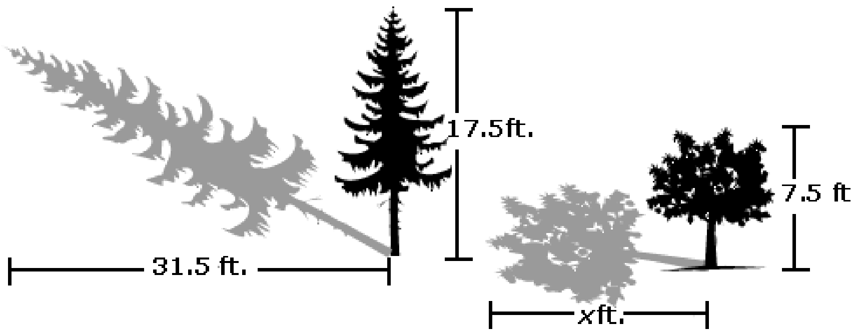


Statements	Reasons

MAFS.912.G-SRT.2.5 EOC Practice

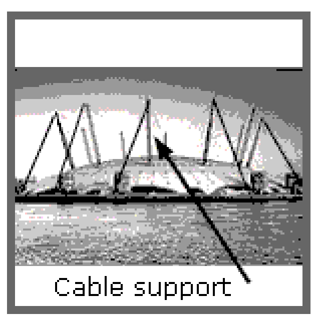
Level 2	Level 3	Level 4	Level 5
finds measures of sides and angles of congruent and similar triangles when given a diagram	solves problems involving triangles, using congruence and similarity criteria; provides justifications about relationships using congruence and similarity criteria	completes proofs about relationships in geometric figures by using congruence and similarity criteria for triangles	proves conjectures about congruence or similarity in geometric figures, using congruence and similarity criteria

1. Given the diagram below, what is the value of x?



A. 13.5
B. 14.6
C. 15.5
D. 16.6

2. A scale model of the Millennium Dome in Greenwich, England, was constructed on a scale of 100 meters to 1 foot. The cable supports are 50 meters high and form a triangle with the cables. How high are the cable supports on the scale model that was built?



A. 0.5 foot
B. 1 foot
C. 1.5 feet
D. 2 feet

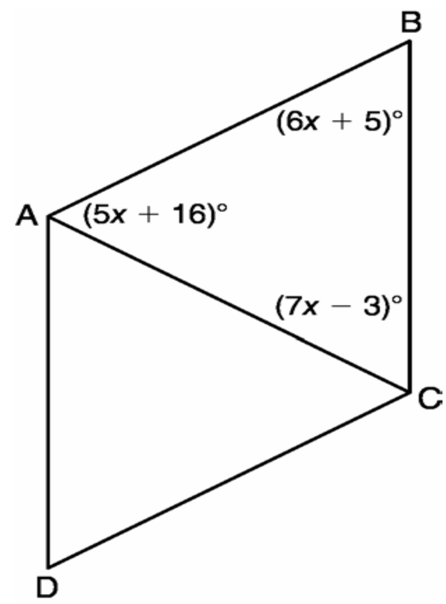
3. Hector knows two angles in triangle A are congruent to two angles in triangle B. What else does Hector need to know to prove that triangles A and B are similar?

   A. Hector does not need to know anything else about triangles A and B.
   B. Hector needs to know the length of any corresponding side in both triangles.
   C. Hector needs to know all three angles in triangle A are congruent to the corresponding angles in triangle B.
   D. Hector needs to know the length of the side between the corresponding angles on each triangle.

4. Figure ABCD, to the right, is a parallelogram.

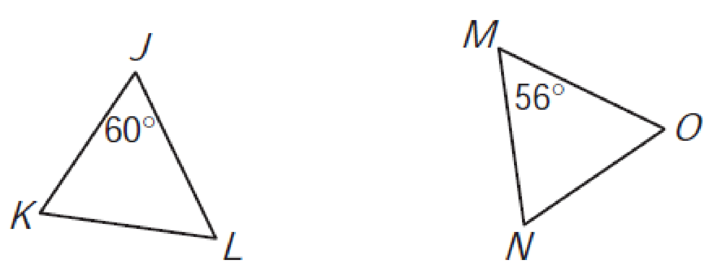
   What is the measure of $\angle ACD$?

   A. 59°
   B. 60°
   C. 61°
   D. 71°



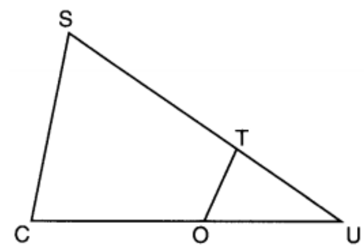
(Not drawn to scale)

5. In the diagram below, $\Delta JKL \cong \Delta ONM$.



Based on the angle measures in the diagram, what is the measure, in degrees, of $\angle N$? Enter your answer in the box.

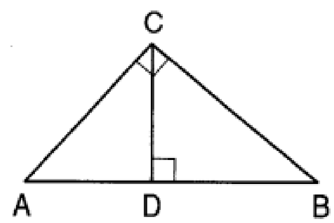
6. In ΔSCU shown below, points T and O are on $\overline{SU}$ and $\overline{CU}$, respectively. Segment $\overline{OT}$ is drawn so that $\angle C \cong \angle OTU$.



If $TU = 4$, $OU = 5$, and $OC = 7$, what is the length of $\overline{ST}$?

A. 5.6
B. 8.75
C. 11
D. 15

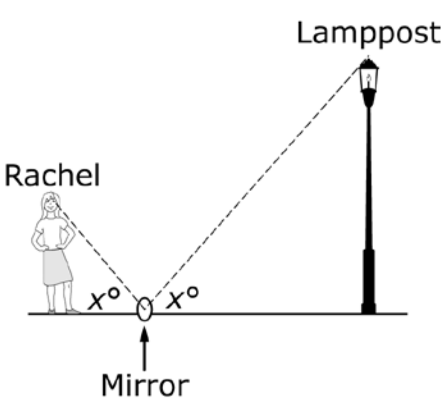
7. In the diagram below, $\overline{CD}$ is the altitude drawn to the hypotenuse $\overline{AB}$ of right triangle ABC.



Which lengths would not produce an altitude that measures $6\sqrt{2}$?

A. $AD = 2$ and $DB = 36$
B. $AD = 3$ and $AB = 24$
C. $AD = 6$ and $DB = 12$
D. $AD = 8$ and $AB = 17$

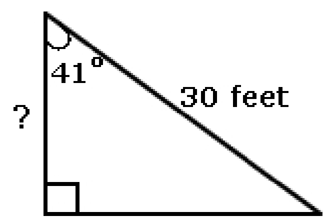
8. To find the height of a lamppost at a park, Rachel placed a mirror on the ground 20 feet from the base of the lamppost. She then stepped back 4 feet so that she could see the top of the lamp post in the center of the mirror. Rachel's eyes are 5 feet 6 inches above the ground. What is the height, in feet, of the lamppost?



MAFS.912.G-SRT.3.8 EOC Practice

Level 2	Level 3	Level 4	Level 5
calculates unknown side lengths using the Pythagorean theorem given a picture of a right triangle; recognizes the sine, cosine, or tangent ratio when given a picture of a right triangle with two sides and an angle labeled	solves for sides of right triangles using trigonometric ratios and the Pythagorean theorem in applied problems; uses the relationship between sine and cosine of complementary angles	assimilates that the ratio of two sides in one triangle is equal to the ratio of the corresponding two sides of all other similar triangles leading to definitions of trigonometric ratios for acute angles; explains the relationship between the sine and cosine of complementary angles; solves for missing angles of right triangles using sine, cosine, and tangent	uses the modeling context to solve problems that require more than one trigonometric ratio and/or the Pythagorean theorem; solves for sides of right triangles using trigonometric ratios and the Pythagorean theorem when side lengths and/or angles are given using variables

1. A 30-foot long escalator forms a 41° angle at the second floor. Which is the closest height of the first floor?



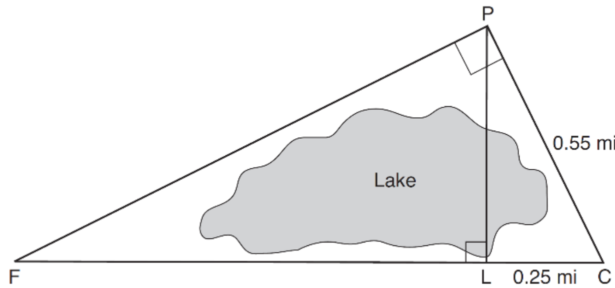
   A. 20 feet
   B. 22.5 feet
   C. 24.5 feet
   D. 26 feet

2. Jane and Mark each build ramps to jump their remote-controlled cars.
   Both ramps are right triangles when viewed from the side. The incline of Jane's ramp makes a 30-degree angle with the ground, and the length of the inclined ramp is 14 inches. The incline of Mark's ramp makes a 45-degree angle with the ground, and the length of the inclined ramp is 10 inches.

   Part A
   What is the horizontal length of the base of Jane's ramp and the base of Mark's ramp? Enter your answer in the box.

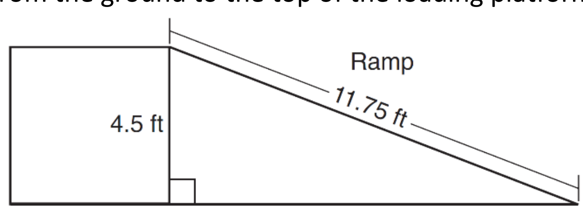
   Part B
   Which car is launched from the highest point? Enter your answer in the box.

3. In the diagram below, the line of sight from the park ranger station, P, to the lifeguard chair, L, on the beach of a lake is perpendicular to the path joining the campground, C, and the first aid station, F. The campground is 0.25 mile from the lifeguard chair. The straight paths from both the campground and first aid station to the park ranger station are perpendicular.



If the path from the park ranger station to the campground is 0.55 mile, determine and state, to the nearest hundredth of a mile, the distance between the park ranger station and the lifeguard chair. Gerald believes the distance from the first aid station to the campground is at least 1.5 miles. Is Gerald correct? Justify your answer.

4. The diagram below shows a ramp connecting the ground to a loading platform 4.5 feet above the ground. The ramp measures 11.75 feet from the ground to the top of the loading platform.

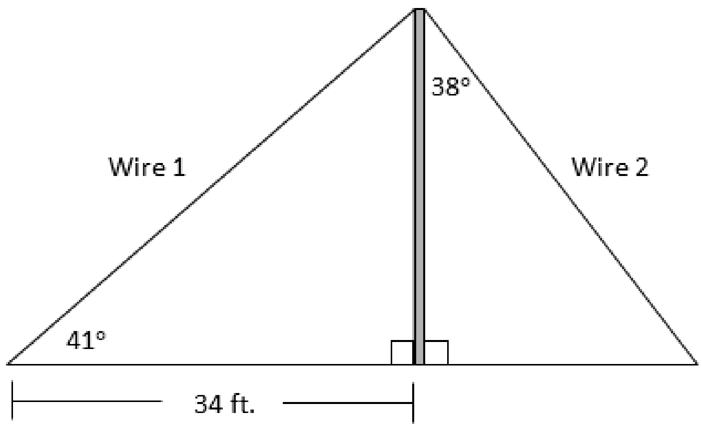


Determine and state, to the nearest degree, the angle of elevation formed by the ramp and the ground.

5. In ΔABC, the complement of $\angle B$ is $\angle A$. Which statement is always true?

A. $tan\angle A = tan\angle B$
B. $sin\angle A = sin\angle LB$
C. $cos\angle A = tan\angle B$
D. $sin\angle A = cos\angle B$

6. In the figure below, a pole has two wires attached to it, one on each side, forming two right triangles.

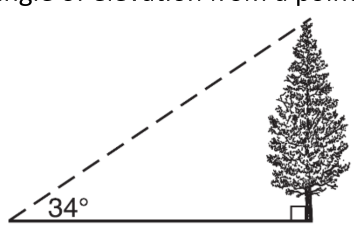


Based on the given information, answer the questions below.
How tall is the pole? Enter your answer in the box.

How far from the base of the pole does Wire 2 attach to the ground? Enter your answer in the box.

How long is Wire 1? Enter your answer in the box.

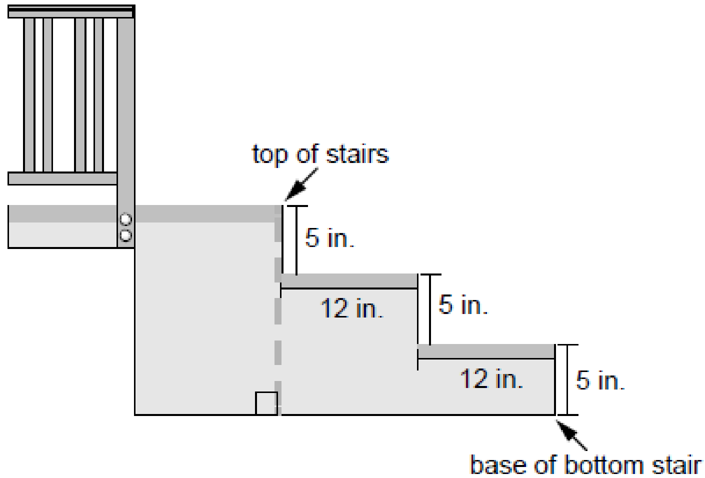
7. As shown in the diagram below, the angle of elevation from a point on the ground to the top of the tree is 34°.



If the point is 20 feet from the base of the tree, what is the height of the tree, to the nearest tenth of a foot?

A. 29.7
B. 16.6
C. 13.5
D. 11.2

8. Leah needs to add a wheelchair ramp over her stairs. The ramp will start at the top of the stairs. Each stair makes a right angle with each riser.



Note: Not to scale

Part A

The ramp must have a maximum slope of $\frac{1}{12}$. To the nearest hundredth of a foot, what is the shortest length of ramp that Leah can build and not exceed the maximum slope? Enter your answer in the box.

Part B

Leah decides to build a ramp that starts at the top of the stairs and ends 18 feet from the base of the bottom stair. To the nearest hundredth of a foot, what is the length of the ramp? Enter your answer in the box.

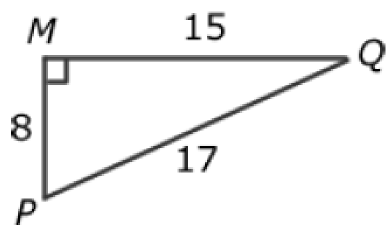
Part C

To the nearest tenth of a degree, what is the measure of the angle created by the ground and the ramp that Leah builds in part B? Enter your answer in the box.

MAFS.912.G-SRT.3.6 EOC Practice

Level 2	Level 3	Level 4	Level 5
calculates unknown side lengths using the Pythagorean theorem given a picture of a right triangle; recognizes the sine, cosine, or tangent ratio when given a picture of a right triangle with two sides and an angle labeled	solves for sides of right triangles using trigonometric ratios and the Pythagorean theorem in applied problems; uses the relationship between sine and cosine of complementary angles	assimilates that the ratio of two sides in one triangle is equal to the ratio of the corresponding two sides of all other similar triangles leading to definitions of trigonometric ratios for acute angles; explains the relationship between the sine and cosine of complementary angles; solves for missing angles of right triangles using sine, cosine, and tangent	uses the modeling context to solve problems that require more than one trigonometric ratio and/or the Pythagorean theorem; solves for sides of right triangles using trigonometric ratios and the Pythagorean theorem when side lengths and/or angles are given using variables

1. What is the sine ratio of $\angle P$ in the given triangle?



A. $\frac{8}{17}$
B. $\frac{8}{15}$
C. $\frac{15}{17}$
D. $\frac{15}{8}$

2. Kendall drew a right triangle. The tangent value for one angle in her triangle is 1.8750. Which set of side lengths could belong to a right triangle similar to the triangle Kendall drew?

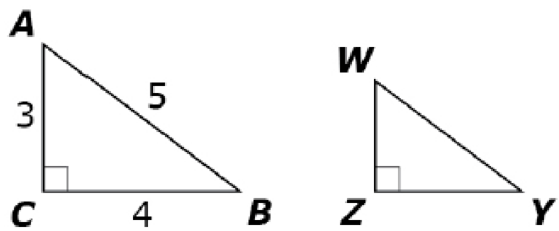
A. 16 cm, 30 cm, 35 cm
B. 8 cm, 15 cm, 17 cm
C. 6 cm, 8 cm, 10 cm
D. 1.875 cm, 8 cm, 8.2 cm

3. Angles F and G are complementary angles.
   - As the measure of angle F varies from a value of x to a value of y, $sin(F)$ increases by 0.2.

   How does $cos(G)$ change as F varies from x to y?

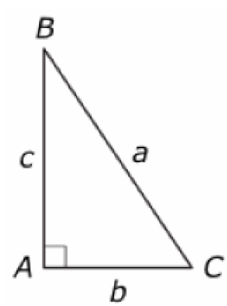
A. It increases by a greater amount.
B. It increases by the same amount.
C. It increases by a lesser amount.
D. It does not change.

4. Select all angles whose tangent equals $\frac{3}{4}$.



- ☐ ∠A
- ☐ ∠B
- ☐ ∠C
- ☐ ∠W
- ☐ ∠Y
- ☐ ∠Z

5. The figure shows right ΔABC.



Of the listed values are equal to the sine of B? Select ALL that apply.

- ☐ $\frac{b}{c}$
- ☐ $\frac{c}{a}$
- ☐ $\frac{b}{a}$
- ☐ The cosine of B
- ☐ The cosine of C
- ☐ The cosine of $(90° - B)$
- ☐ The sine of $(90° - C)$

MAFS.912.G-SRT.3.7 EOC Practice

Level 2	Level 3	Level 4	Level 5
calculates unknown side lengths using the Pythagorean theorem given a picture of a right triangle; recognizes the sine, cosine, or tangent ratio when given a picture of a right triangle with two sides and an angle labeled	solves for sides of right triangles using trigonometric ratios and the Pythagorean theorem in applied problems; uses the relationship between sine and cosine of complementary angles	assimilates that the ratio of two sides in one triangle is equal to the ratio of the corresponding two sides of all other similar triangles leading to definitions of trigonometric ratios for acute angles; explains the relationship between the sine and cosine of complementary angles; solves for missing angles of right triangles using sine, cosine, and tangent	uses the modeling context to solve problems that require more than one trigonometric ratio and/or the Pythagorean theorem; solves for sides of right triangles using trigonometric ratios and the Pythagorean theorem when side lengths and/or angles are given using variables

1. Explain why $cos(x) = sin(90 - x)$ for x such that $0 < x < 90$

2. Which is equal to $sin\ 30°$?

   A. cos 30°
   B. cos 60°
   C. sin 60°
   D. sin 70°

3. Adnan states if $cos30° \approx 0.866$, then $sin30° \approx 0.866$. Which justification correctly explains whether or not Adnan is correct?

   A. Adnan is correct because $cosx°$ and $sinx°$ are always equivalent in any right triangle.
   B. Adnan is correct because $cosx°$ and $sinx°$ are only equivalent in a $30° - 60° - 90°$ triangle.
   C. Adnan is incorrect because $cosx°$ and $sin(90 - x)°$ are always equivalent in any right triangle.
   D. Adnan is incorrect because only $cosx°$ and $cos(90 - x)°$ are equivalent in a 30°-60°-90° triangle.

4. In right triangle ABC, $m\angle B \neq m\angle C$. Let $\sin B = r$ and $\cos B = s$. What is $\sin C - \cos C$?

   A. $r + s$
   B. $r - s$
   C. $s - r$
   D. $\frac{r}{s}$

5. In right triangle ABC with the right angle at C, $sin\ A = 2x + 0.1$ and $cos\ B = 4x - 0.7$.

   Determine and state the value of x. Enter your answer in the box.

FSA Geometry End-of-Course Review Packet

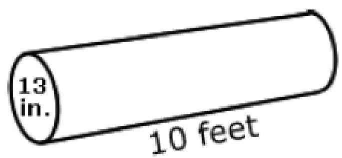
Modeling and Geometry

Table of Contents

MAFS.912.G-MG.1.1 EOC Practice

Level 2	Level 3	Level 4	Level 5
uses measures and properties to model and describe a real-world object that can be modeled by a three- dimensional object	uses measures and properties to model and describe a real- world object that can be modeled by composite three- dimensional objects; uses given dimensions to answer questions about area, surface area, perimeter, and circumference of a real-world object that can be modeled by composite three-dimensional objects	finds a dimension for a real- world object that can be modeled by a composite three-dimensional figure when given area, volume, surface area, perimeter, and/or circumference	applies the modeling cycle to determine a measure when given a real-world object that can be modeled by a composite three-dimensional figure

1. The diameter of one side of a 10-foot log is approximately 13 inches. The diameter of the other side of the log is approximately 11 inches. Which is the best way to estimate the volume (in cubic feet) of the log?



A. $3 \cdot \frac{1}{4} \cdot 10$
B. $3 \cdot 1 \cdot 10$
C. $3 \cdot 36 \cdot 10$
D. $3 \cdot 144 \cdot 10$

2. Based on the two diagrams shown, which formula would be best to use to estimate the volume of City Park Pond?

Diagram 1: Side view of City Park Pond

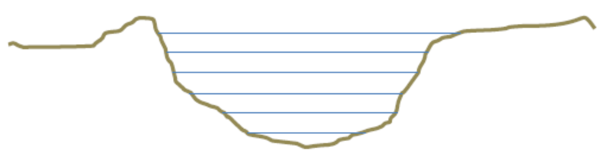
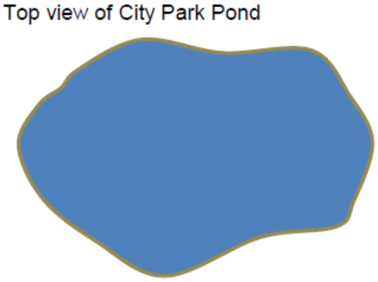
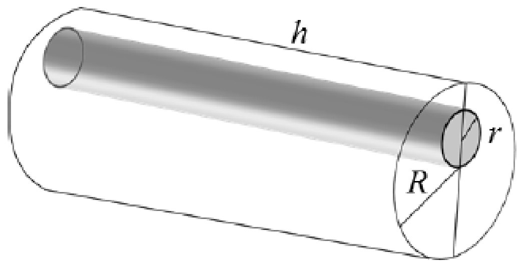


Diagram 2: Top view of City Park Pond



A. $V = \pi r^2 h$
B. $V = \frac{2}{3}\pi r^3$
C. $V = \frac{1}{3}Bh$
D. $V = \frac{1}{3}\pi r^2 h$

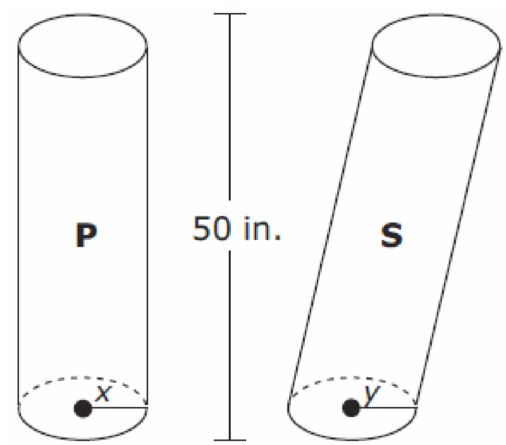
3. An object consists of a larger cylinder with a smaller cylinder drilled out of it as shown.



What is the volume of the object?

A. $\pi(R^2 - r^2)h$
B. $(\pi R^2 - r^2)h$
C. $(R^2 - \pi r^2)h$
D. $\pi(R - r)^2 h$

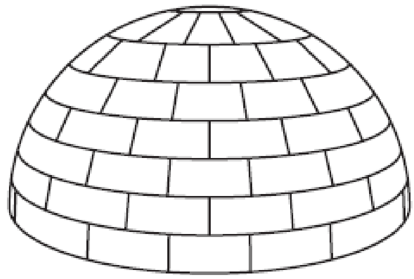
4. Two cylinders each with a height of 50 inches are shown.



Which statements about cylinders P and S are true?
Select ALL that apply.

- ☐ If $x = y$, the volume of cylinder P is greater than the volume of cylinder S, because cylinder P is a right cylinder.
- ☐ If $x = y$, the volume of cylinder P is equal to the volume of cylinder S, because the cylinders are the same height.
- ☐ If $x = y$, the volume of cylinder P is less than the volume of cylinder S, because cylinder S is slanted.
- ☐ If $x < y$, the area of a horizontal cross section of cylinder P is greater than the area of a horizontal cross section of cylinder S.
- ☐ If $x < y$, the area of a horizontal cross section of cylinder P is equal to the area of a horizontal cross section of cylinder S.
- ☐ If $x < y$, the area of a horizontal cross section of cylinder P is less than the area of a horizontal cross section of cylinder S.

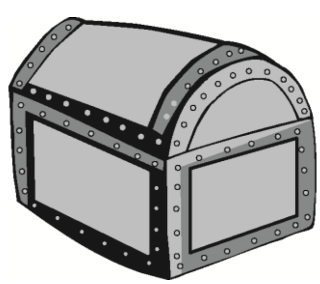
5. An igloo is a shelter constructed from blocks of ice in the shape of a hemisphere. This igloo has an entrance below ground level.



The outside diameter of the igloo is 12 feet. The thickness of each block of ice that was used to construct the igloo is 1.5 feet. Estimate in cubic feet the amount of space of the living area inside the igloo.

6. The figure below shows a 20-foot-tall evergreen tree with a 1-foot-wide trunk. The lowest branches are 3 feet above the ground, and at that level, the tree is 7 feet wide. What is an appropriate shape (or combination of shapes) that can be used to model the tree to estimate the volume of the tree. Indicate the dimensions of the shape(s).

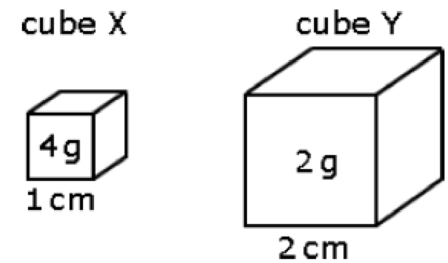
7. The figure below represents a chest. What is an appropriate shape (or combination of shapes) that can be used to model the chest.



MAFS.912.G-MG.1.2 EOC Practice

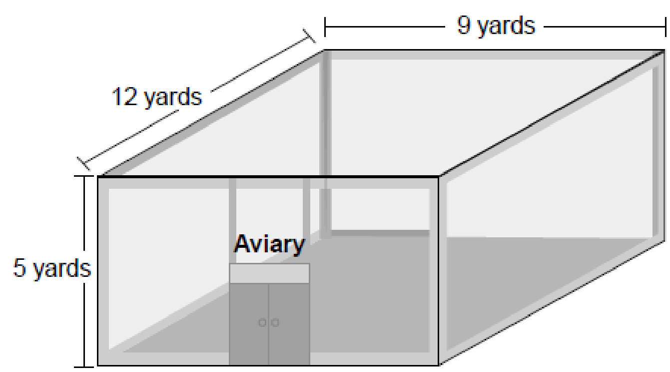
Level 2	Level 3	Level 4	Level 5
calculates density based on a given area, when division is the only step required, in a real-world context	calculates density based on area and volume and identifies appropriate unit rates	finds area or volume given density; interprets units to solve a density problem	applies the basic modeling cycle to model a situation using density

1. Given the size and mass of each of the solid cubes X and Y, how many times is the density of cube X greater than the density of cube Y?



A. 4
B. 6
C. 8
D. 16

2. An aviary is an enclosure for keeping birds. There are 134 birds in the aviary shown in the diagram.



What is the number of birds per cubic yard for this aviary? Round your answer to the nearest hundredth.

A. 0.19 birds per cubic yard
B. 0.25 birds per cubic yard
C. 1.24 birds per cubic yard
D. 4.03 birds per cubic yard

3. County X has a population density of 250 people per square mile. The total population of the county is 150,000. Which geometric model could be the shape of county X?

A. a parallelogram with a base of 25 miles and a height of 25 miles
B. a rectangle that is 15 miles long and 45 miles wide
C. a right triangle with a leg that is 30 miles long and a hypotenuse that is 50 miles long
D. a trapezoid with base lengths of 10 miles and 30 miles and a height of 25 miles

4. Which field has a density of approximately 17,000 plants per acre?

A. 85 acres with 1.02 × 106 plants
B. 100 acres with 1.7 × 107 plants
C. 110 acres with 1.9 × 106 plants
D. 205 acres with 3.4 × 105 plants

5. A typical room air conditioner requires 2.5 BTUs of energy to cool 1 cubic foot of space effectively. For each of the following room sizes, indicate whether a 4,000 BTU air conditioner will meet the requirement to keep the room cool.

Room Length	Room Width	Ceiling Height	Will the Air Conditioner Meet the Requirement to Keep the Room Cool? (yes or no)
14 feet	14 feet	8 feet	
15 feet	12 feet	9 feet	
16 feet	10 feet	9 feet	
20 feet	11 feet	8 feet	

6. The town of Manchester (population 50,000) has the shape of a rectangle that is 5 miles wide and 7 miles long.

Part A

What is the population density, in people per square mile, in Manchester? Round your answer to the nearest whole number of people per square mile.

Part B

The town of Manchester contains a business area in the center of town that has the shape of a disk with a radius of 1 mile. If no one resides in the business area, what is the population density in Manchester, in people per square mile, outside of the business area? Round your answer to the nearest whole number of people per square mile.

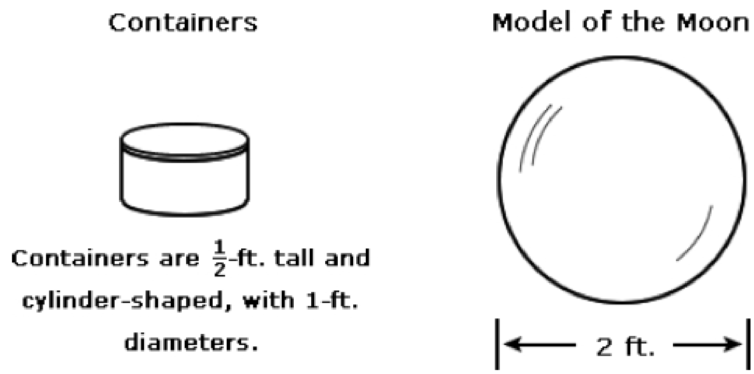
7. A hemispherical tank is filled with water and has a diameter of 10 feet. If water weighs 62.4 pounds per cubic foot, what is the total weight of the water in a full tank, to the nearest pound?

A. 16,336
B. 32,673
C. 130,690
D. 261,381

MAFS.912.G-MG.1.3 EOC Practice

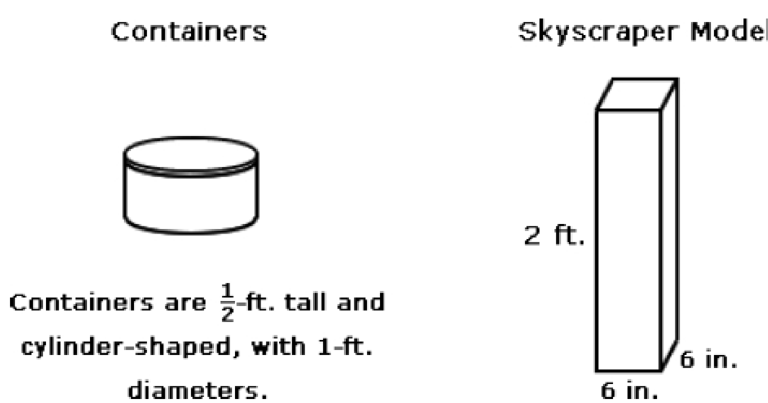
Level 2	Level 3	Level 4	Level 5
uses ratios and a grid system to determine values for dimensions in a real-world context	applies geometric methods to solve design problems where numerical physical constraints are given; writes an equation that models a design problem that involves perimeter, area, or volume of simple composite figures; uses ratios and a grid system to determine perimeter, area, or volume	constructs a geometric figure given physical constraints; chooses correct statements about a design problem; writes an equation that models a design problem that involves surface area or lateral area; uses ratios and a grid system to determine surface area or lateral area	applies the basic modeling cycle to solve a design problem that involves cost; applies the basic modeling cycle to solve a design problem that requires the student to make inferences from the context

1. Stephanie is going to form a clay model of the moon. The model will have a diameter of 2 feet, and the clay she will use comes in containers as described below. What is the least number of containers Stephanie will need in order to complete the model?



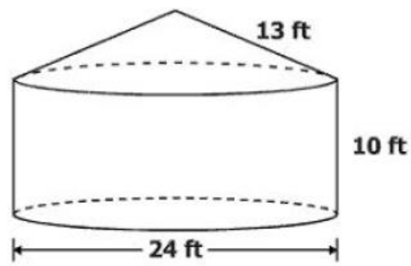
A. 3
B. 11
C. 16
D. 22

2. Lewis is going to form a clay model of a skyscraper. The model will be in the shape of a 2-foot tall prism with a 6-inch by 6-inch base. The clay he will use comes in containers as described below. What is the least number of containers Lewis will need in order to complete the model?



A. 1
B. 2
C. 4
D. 12

3. This container is composed of a right circular cylinder and a right circular cone.



Which is closest to the surface area of the container?

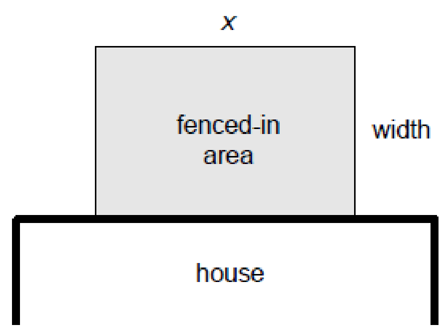
A. $490\ ft^2$
B. $754\ ft^2$
C. $1{,}243\ ft^2$
D. $490\ ft^2$

4. Beth is going to enclose a rectangular area in back of her house.

The house wall will form one of the four sides of the fenced-in area, so Beth will only need to construct three sides of fencing.

Beth has 48 feet of fencing. She wants to enclose the maximum possible area. What amount of fence should Beth use for the side labeled x?

A. 12 feet
B. 16 feet
C. 24 feet
D. 32 feet



Note: not drawn to scale

5. A farmer wants to build a new grain silo. The shape of the silo is to be a cylinder with a hemisphere on top, where the radius of the hemisphere is to be the same length as the radius of the base of the cylinder. The farmer would like the height of the silo's cylinder portion to be 3 times the diameter of the base of the cylinder. What should the radius of the silo be if the silo is to hold $22{,}500\pi$ cubic feet of grain?

6. A wooden block measuring 6 inches by 8 inches by 10 inches is to be carved into the shape of a pyramid.

   Part A
   What is the largest volume of a pyramid that can be made from the block?

   Part B
   Does the length of the sides that are chosen for the base of the pyramid have an effect on your calculation in Part A? Justify your answer.

7. Hank is putting jelly candies into two containers. One container is a cylindrical jar with a height of 33.3 centimeters and a diameter of 8 centimeters. The other container is spherical. Hank determines that the candies are cylindrical in shape and that each candy has a height of 2 centimeters and a diameter of 1.5 centimeters. He also determines that air take up 20% of the volume of the containers. The rest of the space will be taken up by the candies.

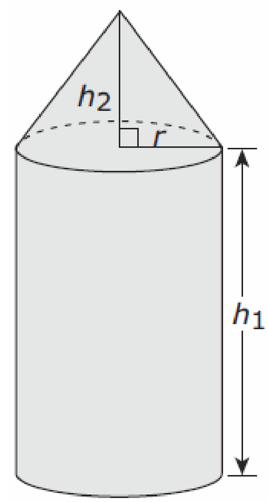
   Part A
   After Hank fills the cylindrical jar with candies, what will be the volume, in cubic centimeters, of the air in the cylindrical jar? Round your answer to the nearest whole cubic centimeter.

   Part B
   What is the maximum number of candies that will fit in the cylindrical jar?

   Part C
   The spherical container can hold a maximum of 280 candies. Approximate the length of the radius, in centimeters, of the spherical container. Round your answer to the nearest tenth.

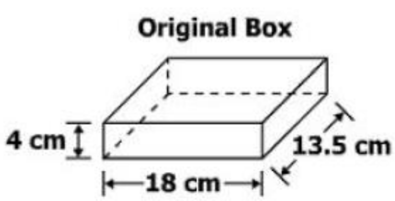
   Part D
   Hank is filling the cylindrical container using bags of candy that have a volume of 150 cubic centimeters. Air takes up 10% of the volume of each bag, and the rest of the volume is taken up by candy. How many bags of candy are needed to fill the cylindrical container with 260 candies?

8. The Farmer Supply is building a storage building for fertilizer that has a cylindrical base and a cone-shaped top. The county laws say that the storage building must have a maximum width of 8 feet and a maximum height of 14 feet.



Dump trucks deliver fertilizer in loads that are 4 feet tall, 6 feet wide, and 12 feet long. Farmer Supply wants to be able to store 2 dump-truck loads of fertilizer.
Determine a height of the cylinder, h_1, and a height of the cone, h_2 , that Farmer Supply should use in the design.
Show that your design will be able to store at least two dump-truck loads of fertilizer.
Enter your answer and your work in the space provided.

9. A cell phone box in the shape of a rectangular prism is shown. The height of the box is $4\ cm$.



The height of the original box will be increased by 3.5 centimeters so a new instruction manual and an extra battery can be included. Which is closest to the total surface area of the new box?

A. 479 cm^2
B. 707 cm^2
C. 738 cm^2
D. 959 cm^2

10. Mr. Fontenot planted four types of soybeans on his land in order to compare overall cost (for planting and harvesting) and crop harvest. The table shows the number of acres planted, the cost per acre, and the number of bushels of soybeans produced for the different types of soybeans.

Type of Soybean	Number of Acres Planted	Cost (per acre) to Harvest	Number of Bushels Produced
A	200	$174.70	9,000
B	150	$180.90	7,500
C	100	$192.40	5,900
D	75	$204.00	4,500

Part A

Regulations specify that Mr. Fontenot cannot devote more than 80% of a field to one particular type of soybean. He wants to design a field so that he can harvest the most soybeans for the lowest cost. What is the best design plan for Mr. Fontenot's 525 acres? Include specific details about which soybeans you chose, how many acres of each type should be planted, and why you chose those soybeans.

Part B

This table shows the profit Mr. Fontenot can earn per bushel for each type of soybean.

Type of Soybean	Profit per Bushel
A	$4.50
B	$3.88
C	$3.96
D	$4.24

Determine if the design plan created in part A is the most profitable 80/20 design.

- If part A is the most profitable plan, explain why it is the most profitable and include specific details about the profitability of the plan from part A compared to all other possible design plans.

OR

- If part A is not the most profitable plan, determine which design plan is the most profitable and include specific details about the profitability of the plan from part A compared to this design plan.