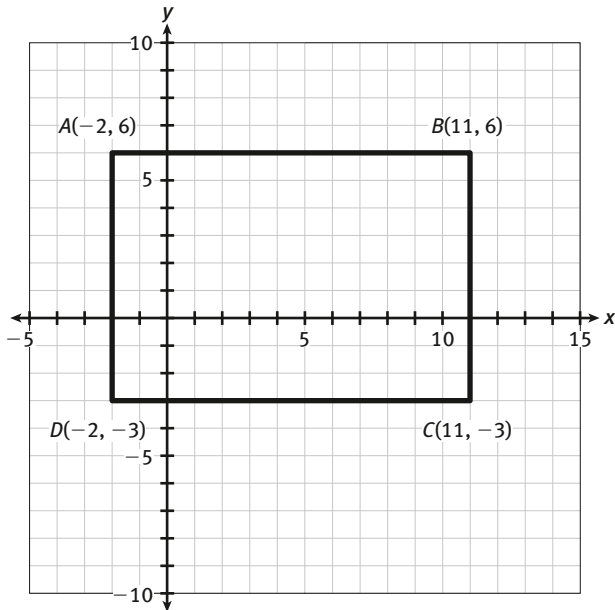


# Geometry Unit 5 Practice

## LESSON 30-1

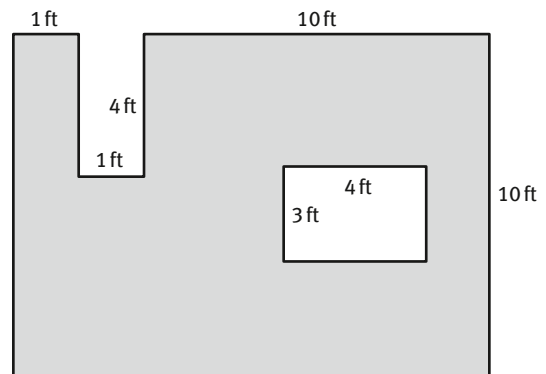
1. Use the diagram shown.



- What kind of figure is  $ABCD$ ? How do you know?
  - What are the dimensions of  $ABCD$ ?
  - What formula can you use to find the area of  $ABCD$ ?
  - Find the area of  $ABCD$ .
2. A circle with radius 7 is inscribed in a square. What is the area of the square?

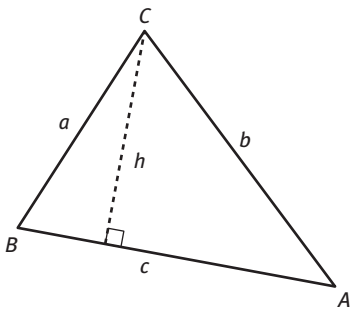
3. Reason quantitatively. A figure has vertices  $P(-3, 1)$ ,  $Q(9, 1)$ ,  $R(3, -7)$ , and  $S(-9, -7)$ .
- What is the most specific name that can be given to  $PQRS$ ? Explain how you know.
  - Find  $PQ$ ,  $QR$ ,  $RS$ , and  $SP$ .
  - What is the perimeter of quadrilateral  $PQRS$ ?
  - What is the area of quadrilateral  $PQRS$ ?
4. A parallelogram has a fixed base and a fixed perimeter. Which of the following statements is true?
- As the height decreases, the area decreases.
  - As the height decreases, the diagonals do not change.
  - As the height increases, the perimeter increases.
  - The height must be less than the base.

5. Model with mathematics. Find the area of the shaded region.



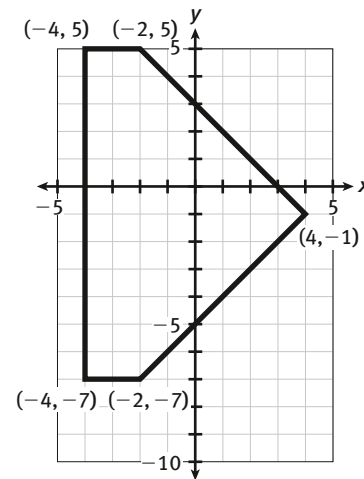
## LESSON 30-2

6. A triangle has coordinates  $A(7, 6)$ ,  $B(9, 1)$ , and  $C(-2, 1)$ . What is the area of the triangle?
7. **Express regularity in repeated reasoning.** What is the area of each equilateral triangle?
- side 12 cm
  - height  $4\sqrt{3}$  units
  - perimeter 10 in.
  - height 7 units
8. Which of the following is NOT a formula for the area of  $\triangle ABC$ ?



- $A = \frac{1}{2}hc$
  - $A = \frac{1}{2}bc \sin A$
  - $A = \frac{1}{2}ac \sin B$
  - $A = \frac{1}{2}hc \sin C$
9. What is the area of an isosceles triangle with sides 8 cm, 15 cm, and 15 cm?

10. **Reason quantitatively.** Find the area and perimeter of the figure shown. If necessary, write your answers to the nearest hundredth.

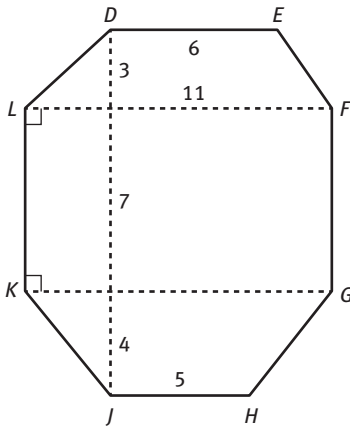


## LESSON 30-3

11. **Make use of structure.** Find the area of each rhombus.
- The diagonals are 12 cm and 18 cm.
  - The sides are 10 cm and two sides meet at a  $45^\circ$  angle.
  - The sides are 8 in. and one diagonal is 8 in.
  - The perimeter is 40 cm and the height is 7 cm.
12. Find the area of each trapezoid.
- The height is 6 cm, and the bases are 11 cm and 15 cm.
  - The height and one base are 7 in., and the other base is 11 in.
  - Each leg is 5 in., the perimeter is 30 in., and the height is 4 in.
  - The vertices have coordinates  $(3, -1)$ ,  $(8, -1)$ ,  $(13, -5)$ , and  $(-1, -5)$ .

13. The area of a rhombus is  $84 \text{ in.}^2$  and one diagonal is 12 in. Find the length of the other diagonal.

14. **Model with mathematics.** Find the area of figure *DEFGHJKL*.



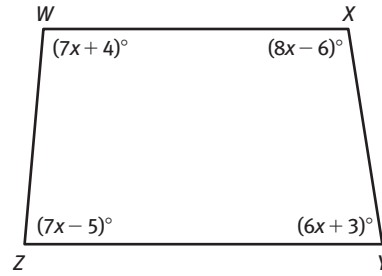
15. Which statement is NOT true?



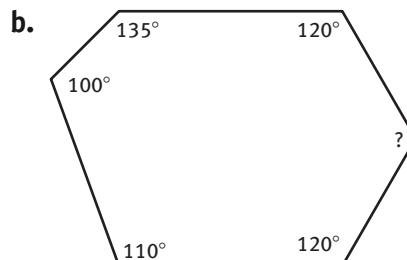
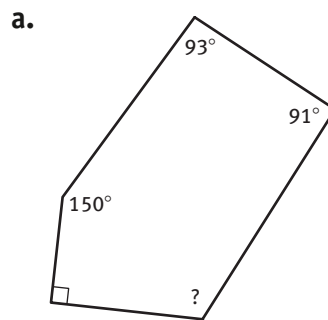
- A. The area of trapezoid *BCEH* is equal to the area of rectangle *ADEH* minus the sum of the areas of triangle *ABH* and triangle *CDE*.
- B. The area of trapezoid *BCEH* is equal to the area of rectangle *BCFG* plus the area of triangle *BGH* plus the area of triangle *CFE*.
- C. The area of trapezoid *BCEH* is equal to the area of rectangle *BCFG* plus the area of rectangle *ABGH* minus the area of rectangle *CDEF*.
- D. The area of trapezoid *BCEH* is equal to the area of rectangle *ADEH* minus the area of triangle *ABH* minus the area of triangle *CDE*.

### LESSON 31-1

16. **Make sense of problems.** Use the diagram shown.

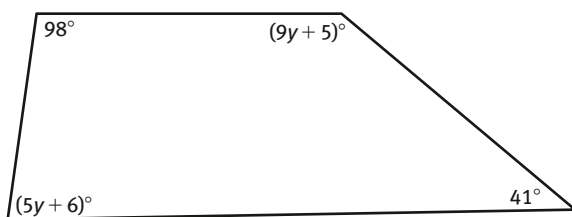


- a. Solve for  $x$ .
  - b. Calculate the measures of angles  $W$ ,  $X$ ,  $Y$ , and  $Z$ .
17. The sum of the measures of the interior angles of a polygon is  $1620^\circ$ . How many sides does it have?
- A. 7
  - B. 9
  - C. 11
  - D. 164
18. **Attend to precision.** Determine the missing angle measure in each polygon.



19. One angle in an isosceles triangle has a measure of  $70^\circ$ .
- Find the measures of the other two angles if the given angle is a base angle.
  - Find the measures of the other two angles if the given angle is the vertex angle.

20. What is the value of  $y$  in the diagram?



## LESSON 31-2

21. Find the measure of an exterior angle for each regular polygon.
- 12-gon
  - 30-gon
  - 60-gon
22. **Express regularity in repeated reasoning.** Find the measure of an interior angle for each regular polygon.
- 8-gon
  - 10-gon
  - 20-gon
  - 24-gon

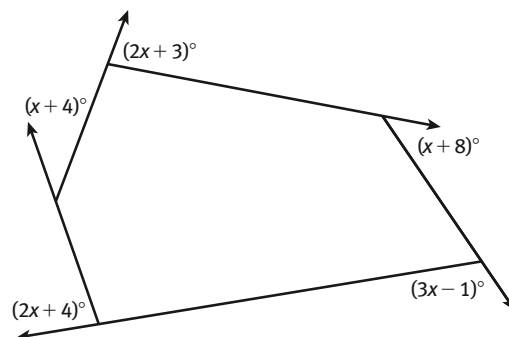
23. A figure is a regular  $n$ -gon. Which of the following expressions represents the sum of the measures of the exterior angles of the polygon, one at each vertex?

- $(180 - n)^\circ$
- $\left(180 - \frac{360}{n}\right)^\circ$
- $(n - 2)180^\circ$
- $360^\circ$

24. A regular polygon has  $n$  sides. Find the measure of an external angle.

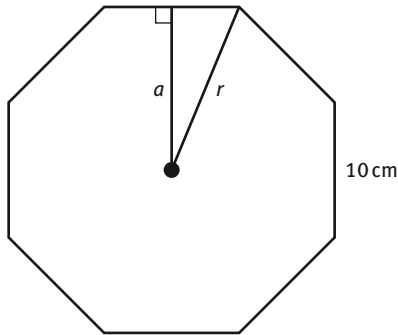
- $n = 4$
- $n = 15$
- $n = 36$
- $n = 40$
- $n = 45$

25. **Make sense of problems.** The diagram shows the measures of the exterior angles of a pentagon. What is the value of  $x$ ?



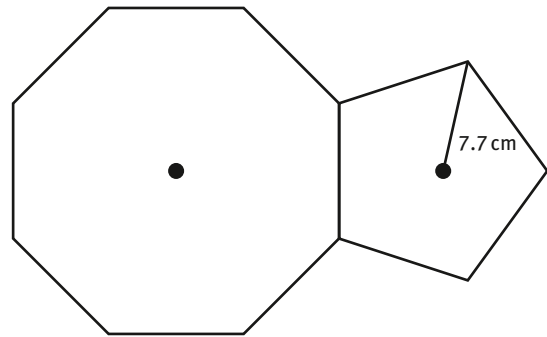
### LESSON 31-3

26. **Use appropriate tools strategically.** The side of a regular octagon is 10 cm.



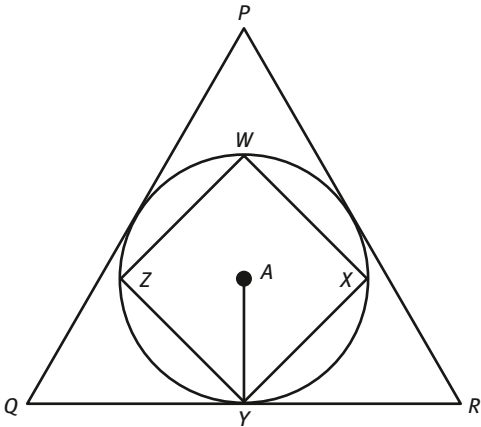
- Find the radius  $r$  of the octagon to the nearest tenth.
  - Find the apothem  $a$  of the octagon to the nearest tenth.
  - What is the perimeter of the octagon?
  - Find the area of the octagon to the nearest tenth.
27. A regular 15-gon is inscribed in a circle with radius 10 cm.
- Find the apothem of the 15-gon to the nearest tenth.
  - Find the side of the 15-gon to the nearest tenth.
  - Find the perimeter of the 15-gon.
  - Find the area of the 15-gon.

28. **Attend to precision.** A regular octagon and a regular pentagon share a common side. The radius of the pentagon is 7.7 cm. Find each value to the nearest tenth.



- What is the apothem of the pentagon?
  - What is the length of the side of the pentagon?
  - What is the apothem of the octagon?
  - What is the area of the octagon?
  - What is the value of the ratio  $\frac{\text{area of octagon}}{\text{area of pentagon}}$ ?  
Show your work.
29. Which combination of measurements is NOT enough to calculate the area of an inscribed regular polygon?
- the number of sides and the apothem
  - the angle formed by two consecutive radii and the length of a side
  - the number of sides and the angle formed by two consecutive radii
  - the length of a side and the number of sides

30. Circle  $A$  is inscribed in equilateral triangle  $PQR$  and square  $WXYZ$  is inscribed in circle  $A$ . The area of the triangle is  $100\sqrt{3}$  units<sup>2</sup>.



- Find the side and height of  $\triangle PQR$ .
- Find the radius  $AY$  of square  $WXYZ$ .
- Find the length of a side of square  $WXYZ$ .
- What is the area of  $WXYZ$ ?

### LESSON 32-1

31. **Make use of structure.** The side of a square is 10 cm. Find each of the following as an exact value.
- What is the circumference of the largest circle that fits inside the square?
  - What is the area of the largest circle that fits inside the square?
  - What is the circumference of the smallest circle that contains the square?
  - What is the area of the smallest circle that contains the square?

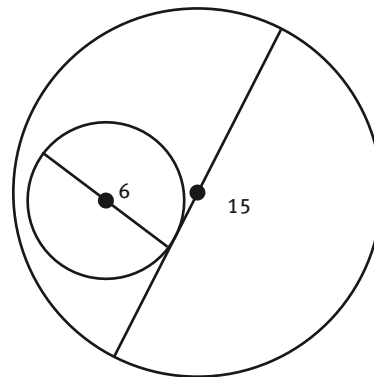
32. Two circles have radii 4 units and 6 units. What is the radius of a circle whose area is equal to the sum of the areas of the two given circles?

- $\sqrt{13}$  units
- $2\sqrt{13}$  units
- 10 units
- 52 units

33. **Model with mathematics.** A circle has the same area as a square with 12-in. sides. What is the circumference of the circle? Write an exact value and a value to the nearest tenth.

34. The wheels of a bicycle have a diameter of 22 in.
- How far does the bicycle travel when the wheels make 30 revolutions?
  - How many revolutions must the wheels make for the bicycle to travel 20,000 in.?

35. A circle with a diameter of 6 units is inside a circle with a diameter of 15 units. Solve each problem and write your answers as exact values.



- What is the area of the larger circle that is not covered by the smaller circle?
- How much longer is the circumference of the larger circle than the circumference of the smaller circle?

**LESSON 32-2**

- 36.** A circle has a radius of 12 in. Find an exact value for each measurement.
- an arc length for a central angle of  $90^\circ$
  - a central angle for an arc length of  $4\pi$  in.
  - an arc length for a central angle of  $120^\circ$
  - a central angle for an arc length of 12 in.
- 37. Attend to precision.** A central angle in a circle is  $40^\circ$ . Find each measurement to the nearest tenth.
- the arc length for the given circle if the radius of the circle is 10 cm
  - the radius of the given circle if the arc length is 20 cm
  - the diameter of the given circle if the arc length is 12 cm
  - the arc length of the given circle if the diameter is 24 cm
- 38. Express regularity in repeated reasoning.** Find the area of each sector. Write exact values.
- central angle is  $30^\circ$ , radius is 9 cm
  - central angle is  $60^\circ$ , diameter is 10 in.
  - arc length is 20 cm, central angle is  $45^\circ$
  - central angle is  $50^\circ$ , circumference of circle is  $20\pi$  cm

- 39.** The area of a circle is  $64\pi$  units<sup>2</sup>. Find each measurement to the nearest tenth.
- the area of a sector where the central angle is  $45^\circ$
  - the arc length of a sector whose area is  $8\pi$  units<sup>2</sup>
- 40.** Which statement about circles is NOT true?
- You can find the area of a sector if you know the radius and the central angle.
  - You can find the arc length of a sector if you know the circumference and radius of the circle.
  - You can find the radius of a circle if you know the arc length and central angle of a sector.
  - You can find the central angle of a sector if you know the radius and arc length of the sector.

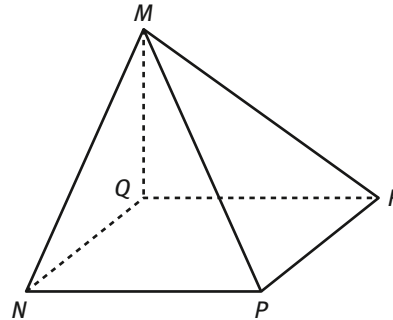
**LESSON 32-3**

- 41.** Convert each radian measure to a measure in degrees.
- $2\pi$
  - $\frac{\pi}{8}$
  - $\frac{\pi}{10}$
  - $5\pi$
  - $\frac{9\pi}{4}$
- 42. Make use of structure.** Convert each measure in degrees to a radian measure.
- $45^\circ$
  - $360^\circ$
  - $120^\circ$
  - $150^\circ$
  - $270^\circ$

- 43.** A circle has center  $(5, 7)$  and a point on the circle is  $(5, 11)$ .
- What is an exact expression for the circumference of the circle?
  - The circle is dilated by a factor of  $\frac{5}{2}$ . What is the length of the radius of the dilated circle?
  - What is the ratio of the circumference of the original circle to the circumference of the dilated circle?
  - What is the ratio of the area of the original circle to the area of the dilated circle?
- 44.** Circles  $A$ ,  $B$ , and  $C$  have the same center. The radii of circles  $A$ ,  $B$ , and  $C$  are 8, 10, and 20, respectively. Which description does NOT result in congruent circles?
- Dilate circle  $A$  by a factor of  $\frac{1}{2}$  and dilate circle  $C$  by a factor of  $\frac{1}{5}$ .
  - Dilate circle  $C$  by a factor of  $\frac{1}{2}$  and dilate circle  $B$  by a factor of 1.
  - Dilate circle  $B$  by a factor of 3 and dilate circle  $C$  by a factor of 1.5.
  - Dilate circle  $A$  by a factor of 3 and dilate circle  $C$  by a factor of 1.5.
- 45. Construct viable arguments.** Two circles have the same center. The diameter of circle  $A$  is 15 and the diameter of circle  $B$  is 12.
- Describe how to dilate circle  $B$  so it is congruent to circle  $A$ .
  - Describe how to dilate circle  $A$  so it is congruent to circle  $B$ .
  - Find the ratio of the circumference of circle  $A$  to the circumference of circle  $B$ .
  - Find the ratio of the area of circle  $A$  to the area of circle  $B$ .

## LESSON 33-1

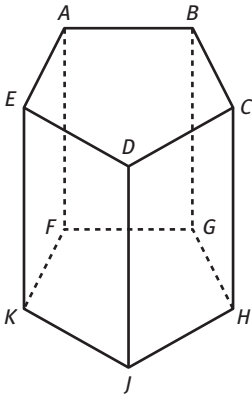
- 46. Model with mathematics.** In this diagram,  $NPRQ$  is a rectangle.



- What is the shape of the cross section made by a plane that is parallel to the base?
- What is the shape of the cross section made by a plane perpendicular to the base that contains point  $M$  but does not contain any of the vertices of the base?
- What shapes are in the net of the pyramid, and how many of each kind are there?
- How many vertices, edges, and faces does the pyramid have?

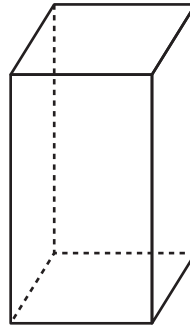


47. In the diagram,  $ABCDE$  and  $FGHJK$  are congruent regular pentagons.



- a. What is the shape of the cross section made by a plane that is parallel to the base?
- b. What is the shape of the cross section made by a plane that contains points  $A$ ,  $C$ , and  $J$ ?
- c. What shapes are in the net of the prism, and how many of each kind are there?
- d. How many vertices, edges, and faces does the prism have?
48. A prism has 18 edges and 8 faces. How many vertices does the prism have?

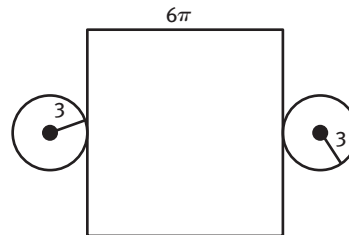
49. A plane intersects this rectangular prism and forms a cross section. Which shape CANNOT be a cross section of the prism?



- A. triangle  
B. circle  
C. rectangle  
D. square
50. **Construct viable arguments.** Can you create a polyhedron with 9 vertices and 16 edges? Justify your reasoning.

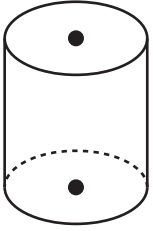
### LESSON 33-2

51. Which statement describes a figure that can be formed using the net shown?



- A. The figure is a cylinder whose base has a circumference of 6 and whose height is  $6\pi$ .
- B. The figure is a cylinder whose base has a circumference of  $6\pi$  and whose height is 6.
- C. The figure is a cylinder whose base has a circumference of  $6\pi$  and whose height is  $6\pi$ .
- D. The figure is a cone whose base has a radius of 3 and whose height is  $6\pi$ .

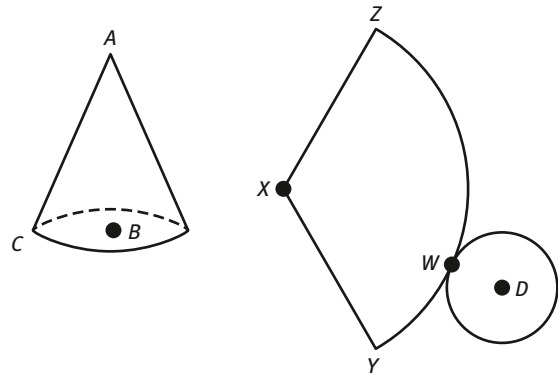
52. A plane intersects the cylinder shown.



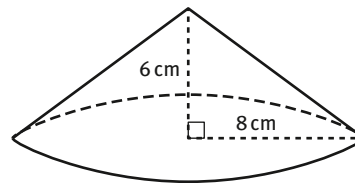
- What is the shape of the cross section if the plane is parallel to the bases?
- What is the shape of the cross section if the plane is perpendicular to the bases?
- Can a cross section of the cylinder be a segment? Explain your answer.
- Suppose a plane is perpendicular to the base. Are cross sections that contain the center of the base different from cross sections that do not contain the center of base? Explain.

53. What shapes are used in a net for a cylinder? How are those shapes related to each other?

54. **Model with mathematics.** The diagram shows a cone and a net of the cone.



- Which point on the cone corresponds with point  $X$  on the net?
  - Which segment on the net represents the distance from  $A$  to  $C$  on the cone?
  - On the net, which distance is equal to the circumference of circle  $D$ ?
  - What distance on the cone is the same as the distance from  $W$  to  $D$  on the net?
55. **Reason quantitatively.** The right cone shown has a height of 6 cm and a base with a radius of 8 cm.



- What is the exact value of the circumference of the base?
- A plane parallel to the base intersects the cone at a distance of 3 cm from the vertex. What is an exact value for the area of the cross section?

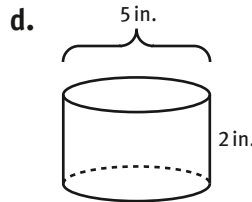
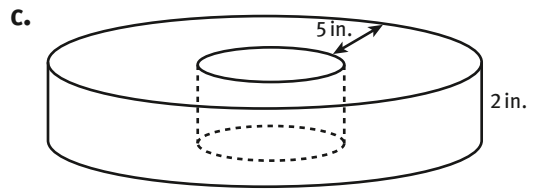
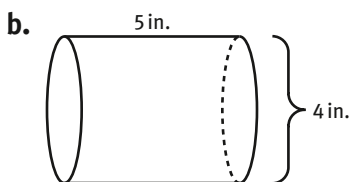
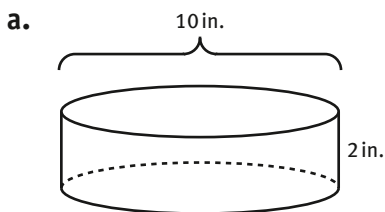
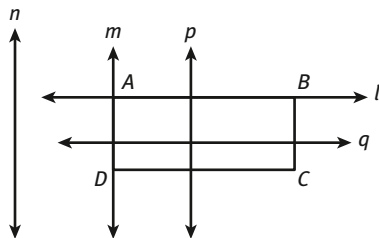
**LESSON 33-3**

**56.** A plane intersects a sphere. State whether or not the plane contains the center of the sphere in each situation.

- a. The cross section is a great circle of the sphere.
- b. The cross section is not a great circle of the sphere.

**57.** The cross section of a sphere and a plane is a point. Describe the relationship between the plane and the sphere.

**58.** The diagram below shows rectangle  $ABCD$  and lines  $\ell$ ,  $m$ ,  $n$ ,  $p$ , and  $q$ , which are possible lines of rotation of the rectangle.  $AB$  is 5 in. and  $BC$  is 2 in. The solids of rotation below were formed from  $ABCD$ . Identify the line that was used as the axis of rotation for each solid.



- 59.** Which of the following statements is NOT true?
- A. A chord of a sphere can have the same length as the radius of the sphere.
  - B. The diameter of a sphere must contain the center of the sphere.
  - C. The intersection of a plane and a sphere is always a great circle.
  - D. A sphere can be generated by rotating a circle around its diameter.

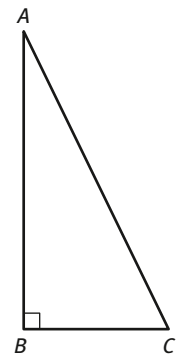
**60. Make use of structure.** A solid of rotation is formed by rotating  $\triangle ABC$  around  $\overline{AB}$ .

a. What shape is formed?

b. What measurement of the solid is  $AB$ ?

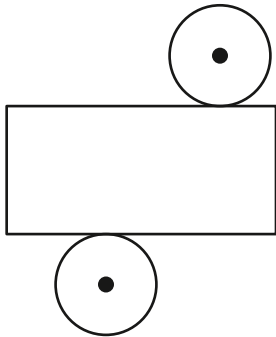
c. What measurement of the solid is  $BC$ ?

d. What distance on the solid is equal to  $AC$ ?



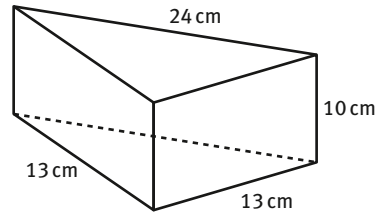
### LESSON 34-1

- 61.** A net for a cylinder is shown below. The diameter of each base and the height of the cylinder are 6 cm. Find each measure to the nearest tenth.



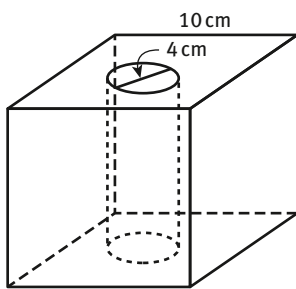
- Find the circumference of each circle in the net.
  - What are the dimensions of the rectangular part of the net?
  - In the net, find the area of each circle and the area of the rectangular part.
  - What is the surface area of the cylinder?
- 62.** An isosceles trapezoid has bases 15 in. and 9 in., and a height of 4 in. The trapezoid is the base of a prism with a height of 5 in.
- What is the length of each leg of the trapezoidal base?
  - What is the perimeter of the trapezoidal base?
  - What is the lateral area of the prism?
  - What is the area of each base of the prism?
  - What is the total surface area of the prism?

- 63. Reason quantitatively.** A triangular prism has a base that is an isosceles triangle with sides 13 cm, 13 cm, and 24 cm. The height of the prism is 10 cm.



- Find the lateral area of the prism.
  - Find the total surface area of the prism.
- 64.** Which statement about the surface area of a prism is NOT true?
- The surface area is (area of base) + (area of base) + (lateral area).
  - The surface area is (perimeter of prism) · (height of prism) · (area of base).
  - The lateral area is the sum of the areas of the lateral surfaces.
  - The lateral area is (perimeter of base) · (height of prism).

- 65. Attend to precision.** A cylinder is cut through a cube. The side of the cube is 10 cm and the diameter of the hole is 4 cm. Write exact values for each measurement.

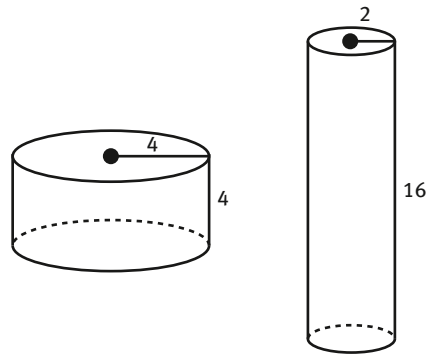


- the lateral area of the cylinder
- the lateral area of the cube
- the area of the top of the cube, not counting the circular hole
- the total surface area of the object, including the lateral area of the cylinder inside the cube

## LESSON 34-2

- 66.** The total surface area of a cube is  $294 \text{ m}^2$ . What is the volume of the cube?
- 67.** A square prism has a base with 8-in. sides and a total surface area of  $288 \text{ in.}^2$ . What is the volume of the prism?

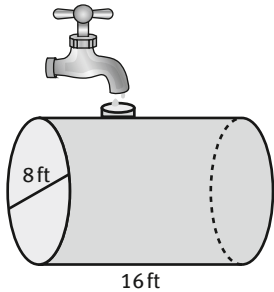
- 68.** Consider the two cylinders shown.



Which statement is true?

- The two cylinders have the same base area.
  - The two cylinders have the same lateral area.
  - The two cylinders have the same surface area.
  - The two cylinders have the same volume.
- 69. Model with mathematics.** Find each missing measurement.
- Find the radius of a cylinder if the cylinder has a height of 3 cm and a volume of  $75\pi \text{ cm}^3$ .
  - Find the height of a prism if the base is a right triangle with legs 3 in. and 5 in., and the volume of the prism is  $150 \text{ in.}^3$ .

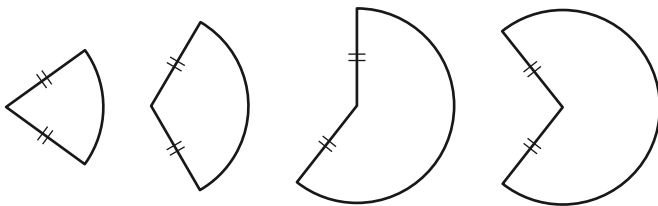
- 70. Attend to precision.** A cylindrical water tank is shown. The diameter of the base is 8 ft and the cylinder is 16 ft long. The cylinder is exactly half filled with water.



- a. How many cubic feet of water are currently in the tank? Write your answer to the nearest hundredth of a cubic foot.
- b. Water is filling the tank at a rate of  $3 \text{ ft}^3$  per minute. In how many minutes will the tank be full? Write your answer to the nearest minute.

### LESSON 35-1

- 71.** Each of these sectors represents the lateral area of a cone. As the angle between the two radii increases, which of the following does NOT increase?

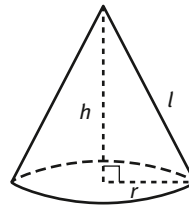


- A. the lateral area of the cone  
 B. the area of the base of the cone  
 C. the height of the cone  
 D. the slant height of the cone

- 72. Persevere in solving problems.** A cone has a radius of 12 units and a slant height of 15 units. Write each measurement as an exact value.

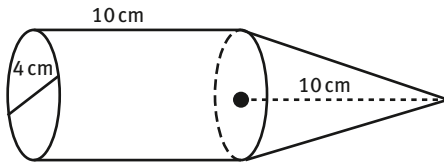
- a. the area of the base of the cone
- b. the lateral area of the cone
- c. the surface area of the cone
- d. the height of the cone

- 73.** Use the given measures of each cone to find an exact value for the missing measure.

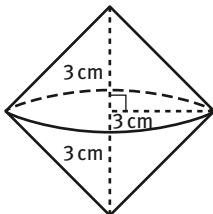


- a.  $r = 5 \text{ cm}$ ,  $l = 8 \text{ cm}$ ; find the lateral area
- b.  $l = 10 \text{ in.}$ ,  $h = 6 \text{ in.}$ ; find the area of the base
- c.  $h = 8 \text{ cm}$ ,  $r = 8 \text{ cm}$ ; find the total surface area
- d. total surface area =  $84\pi \text{ cm}^2$ ,  $l = 8 \text{ cm}$ ; find  $r$

74. The figure shown is formed by a cylinder and a cone that have the same height and the same diameter. Write an exact value for each measure.



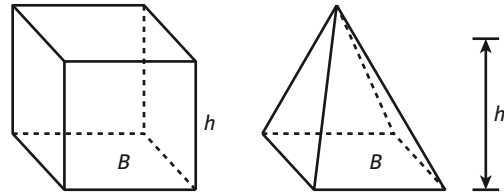
- the area of the base
  - the lateral area of the cylinder
  - the slant height of the cone
  - the lateral area of the cone
  - the total surface area of the figure
75. **Attend to precision.** A surveyor's pendant is a small weight that hangs from a string and is used to establish vertical lines. The pendant shown below is formed from two congruent cones. The radius and height of each cone is 3 cm.



- Find the slant height of each cone to the nearest hundredth.
- Find the total surface area of the surveyor's pendant to the nearest hundredth.

## LESSON 35-2

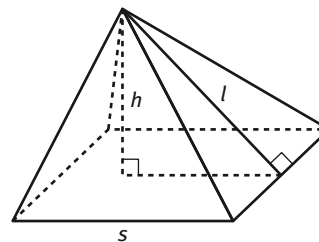
76. How is the volume of a prism related to the volume of a pyramid that has the same base and same height?



- The volumes are not related to each other.
- The volumes are equal.
- The volume of the prism is two times the volume of the pyramid.
- The volume of the prism is three times the volume of the pyramid.

77. **Express regularity in repeated reasoning.**

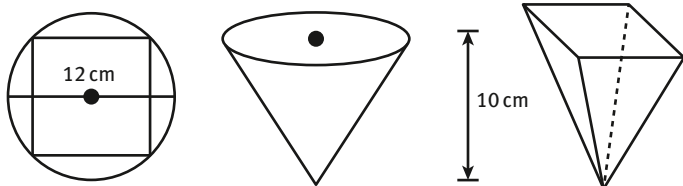
Consider a square pyramid.



- Find the volume of the pyramid if a side of the base is 8 cm and the height is 12 cm.
- Find the slant height and the volume of a pyramid if the base has an area of  $36 \text{ cm}^2$  and a height of 4 cm.
- Find a side of the base if the volume is  $245 \text{ in.}^3$  and the height is 15 in.
- Find the volume if the slant height is 8 units and the height is 6 units.

- 78.** A cone has a volume of  $300 \text{ cm}^3$ . Find each measure to the nearest tenth.
- the height of the cone if the radius of the base is 8 cm
  - the radius of the base if the height of the cone is 10 cm
  - the slant height of the cone if the height of the cone is 12 cm
  - the area of the base if the height and radius are equal

- 79. Construct viable arguments.** A square is inscribed in a circle with a diameter of 12 cm. The circle is used for the base of a cone and the square is used for the base of a pyramid. The cone and pyramid have the same height, 10 cm.



- Before doing any calculations, tell whether the cone or the cylinder has a greater volume. Explain your answer.
- Calculate the difference in the two volumes. Write your answer as an exact value and as a number rounded to the nearest tenth.

- 80.** A student knows the height of a pyramid and the area of its base. What should the student do to find the volume of the pyramid?
- Add the height and the area.
  - Find one third of the sum of the height and area.
  - Multiply the height and the area.
  - Find one third of the product of the height and area.

### LESSON 35-3

- 81.** A wooden paperweight, in the shape of a pyramid, has a base that is an equilateral triangle with a 10-cm side and a height of 3 cm. The density of the wood is  $0.7 \text{ g/cm}^3$ .
- What is the volume of the paperweight? Write your answer to the nearest tenth of a cubic centimeter.
  - What is the mass of the paperweight? Write your answer to the nearest tenth of a gram.
- 82. Attend to precision.** A cone is solid aluminum. The circumference of the cone is 20 cm, the height is 6 cm, and the mass of the cone is 170 g.
- To the nearest hundredth of a centimeter, what is the radius of the base of the cone?
  - To the nearest hundredth of a square centimeter, what is the area of the base of the cone?
  - To the nearest tenth of a cubic centimeter, what is the volume of the cone?
  - To the nearest tenth of a unit, what is the density of the aluminum used to make the cone?

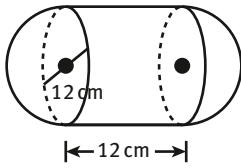


- 83.** An object has the shape of a prism. Which of the following statements is NOT true?
- A.** If you know the mass, density, and base area of the object, you can calculate its height.
  - B.** If you know the base area and height of the object, you can calculate its density.
  - C.** If you know the base area, height, and density of the object, you can calculate its mass.
  - D.** If you know the volume and mass of the object, you can calculate its density.
- 84.** The mass of a container and its contents is 650 kg. When the container is empty its mass is 75 kg, and the capacity of the container is  $15 \text{ m}^3$ . What is the density of the contents of the container? Write your answer to the nearest hundredth in units of  $\text{kg}/\text{m}^3$ .
- 85. Reason quantitatively.** Consider Substance A with a density of  $15 \text{ kg}/\text{m}^3$  and Substance B with a density of  $8 \text{ kg}/\text{m}^3$ .
- a.** If you take equal masses of the two substances and mix them, what is the density of the mixture?
  - b.** Suppose you mix  $20 \text{ m}^3$  of Substance A and  $35 \text{ m}^3$  of Substance B. What is the total mass?
  - c.** What is the total volume of the mixture in Part b?
  - d.** What is the density of the mixture in Part b? Write your answer to the nearest hundredth.

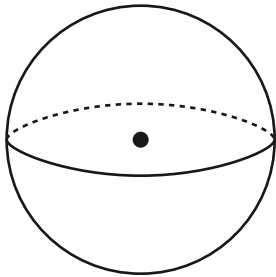
## LESSON 36-1

- 86.** A cross section of a sphere is a great circle. How is the surface area of the sphere related to the area of the cross section?
- A.** The surface area of the sphere is four times the area of the cross section.
  - B.** The surface area of the sphere is two times the area of the cross section.
  - C.** The surface area of the sphere is  $\pi$  times the area of the cross section.
  - D.** The surface area of the sphere is the square of the area of the cross section.
- 87.** For each radius of a sphere, find the surface area of the sphere. Write each answer as an exact value and as a number rounded to the nearest tenth.
- a.**  $r = 8 \text{ in.}$
  - b.**  $r = 20 \text{ cm}$
  - c.**  $r = \frac{3}{4} \text{ in.}$
  - d.**  $r = 0.1 \text{ unit}$
- 88.** Use the formula for the surface area of a sphere.
- a.** Find an exact value for the surface area of a sphere if the radius is 7 cm.
  - b.** Find an exact value for the radius of a sphere if the surface area is  $400\pi \text{ cm}^2$ .
  - c.** Find an exact value for the surface area of a sphere if the circumference of the sphere is  $100\pi$  units.
  - d.** Find an exact value for the circumference of a sphere if the surface area of the sphere is  $4\pi \text{ cm}^2$ .

- 89. Model with mathematics.** A solid figure is formed by a cone and two hemispheres. The diameter of the hemispheres and the length of the cylinder are 12 cm. Find each measure as an exact value.



- the lateral area of the cylindrical part of the figure
  - the total surface area of the object
- 90. Make use of structure.** The number of square inches in the surface area of the sphere shown is equal to the number of linear inches in its circumference. What is the radius of the sphere?



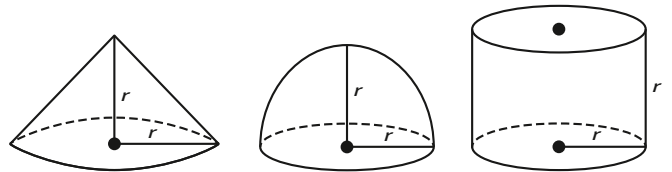
## LESSON 36-2

- 91.** The volume of a sphere is  $100 \text{ cm}^3$ . Find the length of its radius to the nearest tenth.
- 92.** Sphere  $A$  has a radius of 8 cm, and a plane through its center determines two hemispheres. Find an exact value for each measurement.
- the volume of sphere  $A$
  - the surface area of sphere  $A$
  - the total surface area of one hemisphere, including the cross section determined by the plane

- 93. Attend to precision.** The volume of a sphere is  $250 \text{ in.}^3$ . Find each measure to the nearest tenth.

- the diameter
  - the circumference of a great circle
  - the area of a great circle
  - the surface area
- 94.** The number of cubic units in the volume of a sphere is equal to the number of square units in the surface area of the sphere. Which statement about the radius of the sphere is true?
- Its value is  $\pi$ .
  - Its value is 3.
  - Its value is 1 unit.
  - Its value is a measurement less than 1 unit.

- 95. Make use of structure.** In the diagram, the radius of the cone, cylinder, and hemisphere is 3 units. The heights of the cone and cylinder are also 3 units.



- Find exact values for the volumes of the cone, hemisphere, and cylinder.
- Use your results from Part a to find the ratio of the volume of the cone to the volume of the hemisphere.



- 102.** Sphere  $A$  has a radius of 6 cm. Sphere  $B$  has a radius that is 1.5 times the radius of sphere  $A$ . Find the exact values for the following measures.

- the volume of sphere  $A$
- the volume of sphere  $B$
- the ratio of the volume of sphere  $A$  to the volume of sphere  $B$
- the surface areas of sphere  $A$  and sphere  $B$
- the ratio of the surface area of sphere  $A$  to the surface area of sphere  $B$

- 103. Reason quantitatively.** A cube has a volume of  $3375 \text{ in.}^3$ . What is the approximate length of the side of another cube if its volume is four times the volume of the given cube?

- 104. Make sense of problems.** The surface area of sphere  $S$  is  $16\pi \text{ units}^2$ . Find each exact measure.

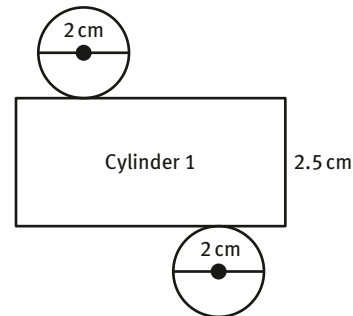
- If the radius of sphere  $S$  is doubled, what is the volume of the resulting sphere?
- If the radius of sphere  $S$  is halved, what is the volume of the resulting sphere?
- What is the ratio of your answer in Part a to your answer in Part b?
- How is your answer in Part c related to the changes to sphere  $S$ ?

- 105.** Which of the following statements is NOT correct?

- If the radius of a sphere is doubled, the volume of the sphere is multiplied by a factor of 8.
- If the radius of a sphere is tripled, the surface area of the sphere is multiplied by a factor of 9.
- If the edge of a cube is multiplied by 4, the volume of the cube is multiplied by a factor of 64.
- If the edge of a cube is multiplied by 5, the surface area of the cube is multiplied by 30.

### LESSON 37-2

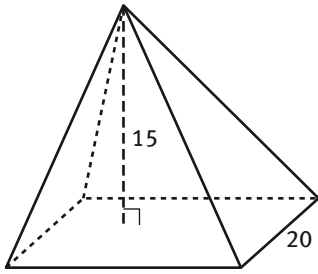
- 106. Persevere in solving problems.** The diagram is a net for cylinder 1.



The height and diameter of cylinder 2 is twice the height and diameter of cylinder 1. Find the following exact measures.

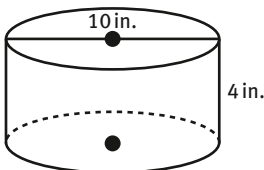
- the volume of cylinder 1
- the volume of cylinder 2
- the ratio of the volume of cylinder 1 to the volume of cylinder 2
- the surface areas of cylinder 1 and cylinder 2
- the ratio of the surface area of cylinder 1 to the surface area of cylinder 2

- 107. Reason quantitatively.** The base of a square pyramid has sides that are 20 units and the height of the pyramid is 15 units.



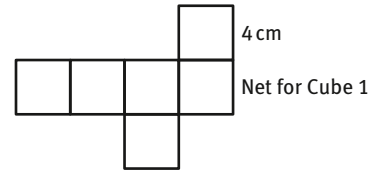
- a. What is the effect on its volume if the side of the base is changed to 10 units and the height is not changed?
- b. What is the effect on its volume if the side of the base is halved and the height is doubled?

- 108.** The diameter of a right cylinder is 10 in. and its height is 4 in. What is the volume of the cylinder if the dimensions are doubled?

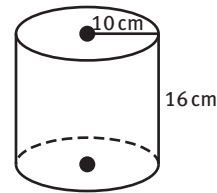


- A.  $6400\pi \text{ in.}^3$                       B.  $800\pi \text{ in.}^3$   
 C.  $640 \text{ in.}^3$                               D.  $200 \text{ in.}^3$

- 109.** The diagram represents a net for cube 1.



- a. Calculate the surface area and volume of cube 1.
- b. The side of cube 2 is twice the side of cube 1. Find the total surface area of cube 2.
- 110.** The radius and height of the cylinder shown are reduced to 80% of the original measures.



- a. What is the effect of this reduction on the surface area?
- b. What is the effect of this reduction on the volume?