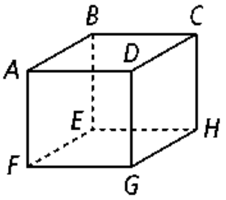
Name______________________________________Class _____________ Date_____________

# 11-1 Practice

*Form K*

## Space Figures and Cross Sections

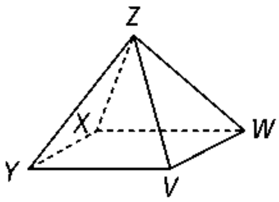
**For each polyhedron, how many vertices, edges, and faces are there? List them.**

**1.** 


Vertices:

Edges: $\overline{AB}$, $\overline{AF}$, $\overline{AD}$, $\overline{BE}$, $\overline{BC}$, $\overline{CD}$, $\overline{CH}$, $\overline{HE}$, $\overline{HG}$, $\overline{GF}$, $\overline{EF}$, $\overline{DG}$

Faces:

**2.** 


Vertices:

Edges: $\overline{XY}$, $\overline{XW}$, $\overline{XZ}$, $\overline{YV}$, $\overline{YZ}$, $\overline{VW}$, $\overline{VZ}$, $\overline{WZ}$

Faces:

**For each polyhedron, use Euler's Formula to find the missing number.**

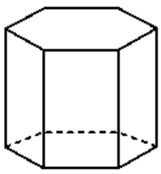
**3.** Faces: ☐ Edges: 8 Vertices: 5

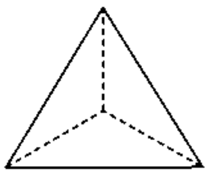
To start, use Euler's formula, then identify the variables and any given values. $F + V = E + 2$

**4.** Faces: 6 Edges: ☐ Vertices: 8

**5.** Faces: 4 Edges: 6 Vertices: ☐

**Verify Euler's Formula for each polyhedron. Then draw a net for the figure and verify Euler's Formula for the two-dimensional figure.**

**6.** 

**7.** 

**Use Euler's Formula to find the number of vertices in each polyhedron.**

**8.** 6 faces that are all squares

**9.** 1 face that is a hexagon, 6 triangular faces

**10.** 2 faces that are pentagons, 5 rectangular faces

**11. Reasoning** Can a polyhedron have 20 faces, 30 edges, and 13 vertices? Explain.

**12. Reasoning** Is a cylinder a polyhedron? Explain.

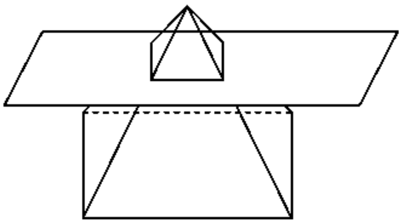
Name______________________________________Class ______________ Date_____________

# 11-1 Practice (continued)

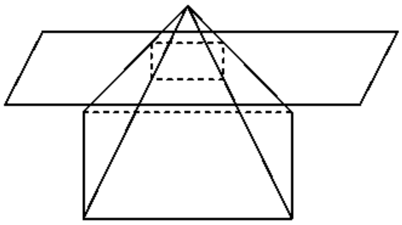
*Form K*

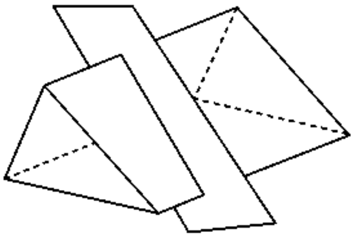
## Space Figures and Cross Sections

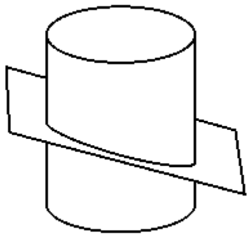
**Describe each cross section.**

**13.** 

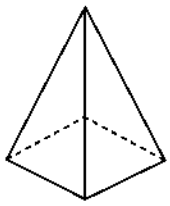
To start, visualize the plane's intersection with the solid.



**14.** 

**15.** 

**Reasoning Can you find a cross section of a square pyramid that forms the figure? Draw the cross section if the cross section exists. If not, explain.**



**16.** isosceles triangle

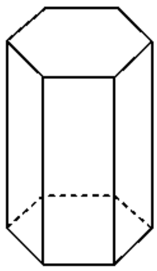
**17.** trapezoid

**18.** scalene triangle

**19.** square

**20.** What is the cross section formed by a plane containing a vertical line of symmetry for the figure at the right?

**21.** What is the cross section formed by a plane that is parallel to the base of the figure at the right?



Name ____________________________________ Class ______________ Date ______________

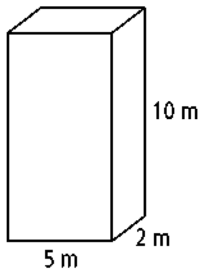
# 11-2 Practice

*Form K*

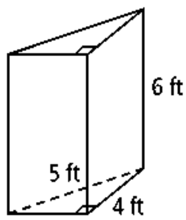
## Surface Areas of Prisms and Cylinders

**Use a net to find the surface area of each prism.**

**1.**




**2.**

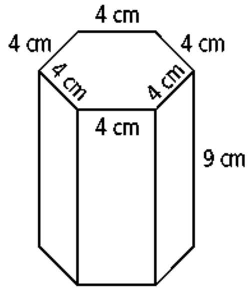



**3. a.** Classify the prism at the right.

**b.** Find the lateral area of the prism.

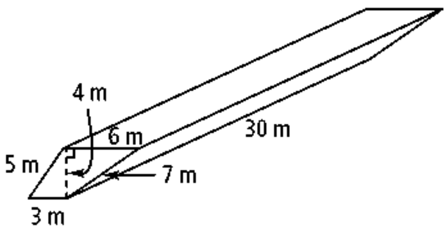
**c.** The bases are regular hexagons. The area of each is about 41.6 $cm^2$. Find the sum of their areas.

**d.** Find the surface area of the prism.




**Use formulas to find the surface area of each prism. Round your answer to the nearest whole number.**

**4.**



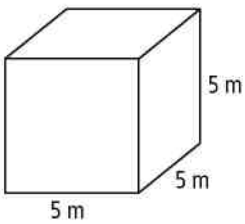

To start, use the formula for the lateral area of a prism, then find the perimeter of the base trapezoid.

L.A. = $ph$

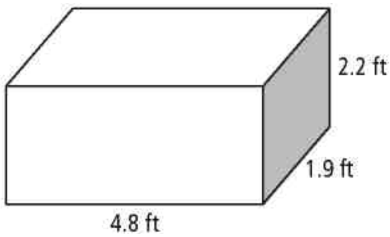
$p = \square + \square + \square + \square$

$= \square$ m

**5.**




**6.**




**7.** A box measures 10 in. wide, 12 in. high, and 14 in. deep. If all surfaces are made of cardboard, how much cardboard is used to make the box?

**8.** An artist creates a right prism whose bases are regular pentagons. He wants to paint the lateral surfaces of the prism. One can of paint can cover 30 $ft^2$. How many cans of paint must he buy if the height of the prism is 15 ft and the length of each side of the pentagon is 5 ft?

Name____________________________________Class _____________ Date_____________

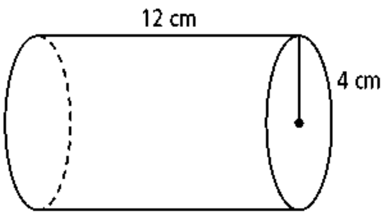
# 11-2 Practice (continued)

*Form K*

## Surface Areas of Prisms and Cylinders

**Find the surface area of each cylinder in terms of π.**

**9.**

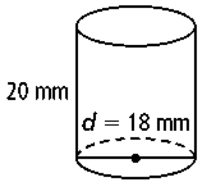



To start, use the formula for the surface area of the cylinder, then identify the variables and any given values.

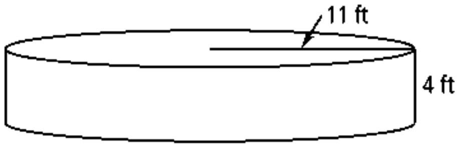
S.A. = $2\pi rh + 2\pi r^2$

$r = \square$ cm, $h = \square$ cm

**10.**

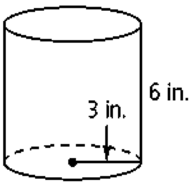



**11.**




**Find the lateral area of each cylinder to the nearest whole number.**

**12.**

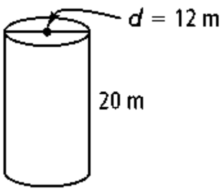



To start, use the formula for the lateral area of the cylinder, then identify the variables and any given values.

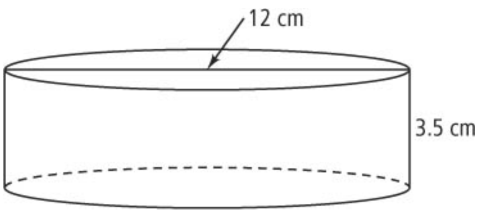
L.A. = $\pi dh$

$h = 6$ in., $d = 2 \cdot \square$ in.= $\square$ in.

**13.**




**14.**




**15. Reasoning** A cylinder has a height that is 2 times as large as its radius. The lateral area of the cylinder is 16π square units.

**a.** What is the length of the radius of the cylinder?

**b.** What is the height of the cylinder?

**c.** What is the surface area of the cylinder? Round your answer to the nearest square unit.

**16. Reasoning** A triangular prism and a rectangular prism both have bases that are regular polygons with sides 2 units long. Which has a greater surface area? Explain.

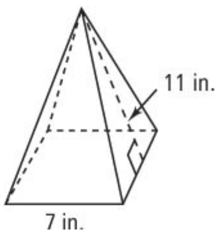
Name________________________________Class ____________ Date____________

# 11-3 Practice

*Form K*

## Surface Areas of Pyramids and Cones

**Find the surface area of each pyramid to the nearest whole number.**

**1.** 

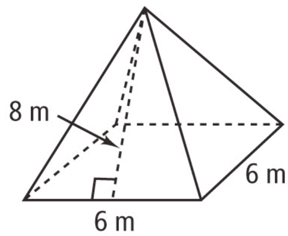

To start, use the formula for surface area of the pyramid, then identify the variables and any given values.

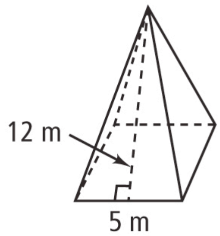
$S.A. = \frac{1}{2}p\ell + B$

$p = 4 \cdot \square = \square$ in.

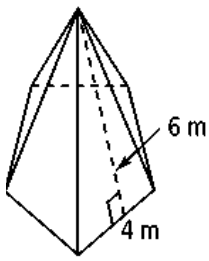
$\ell = \square$ in.

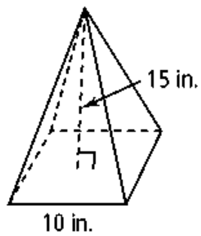
$B = \square \cdot \square = \square$ in.$^2$

**2.** 

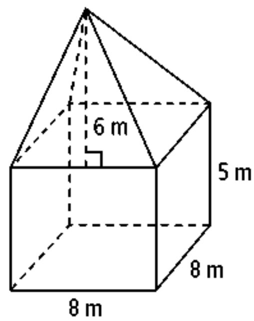

**3.** 


**Find the lateral area of each pyramid to the nearest whole number.**

**4.** 


**5.** 


**6.** The figure at the right has one base and eight lateral faces. Find its surface area to the nearest whole number.




**7.** The roof of a clock tower is a square pyramid. Each side of the base is 16 ft long. The slant height is 22 ft. What is the lateral area of the roof?

**8. Reasoning** Write a formula to show the relationship between surface area and the length of a side of the base ($s$) and slant height in a square pyramid.

**The length of a side ($s$) of the base, slant height ($\ell$), height ($h$), lateral area (L.A.), and surface area (S.A.) are measurements of a square pyramid. Given two of the measurements, find the other three to the nearest tenth.**

**9.** $s = 16$ cm, $\ell = 10$ cm

**10.** L.A. = 624 m$^2$, S.A. = 1200 m$^2$

**11.** $h = 7$ cm, $\ell = 25$ cm

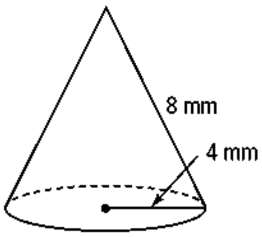
Name________________________________Class______________ Date____________

# 11-3 Practice (continued)

*Form K*

## Surface Areas of Pyramids and Cones

**Find the surface area of each cone in terms of π.**

**12.** 

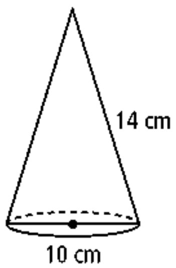

To start, use the formula for surface area of the pyramid, then identify the variables and any given values.

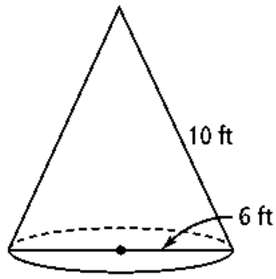
$S.A. = \pi r \ell + B$

$r = \square$ mm

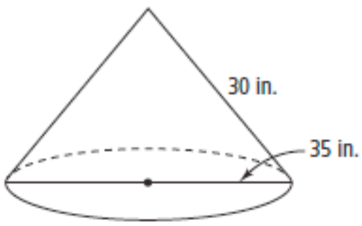
$\ell = \square$ mm

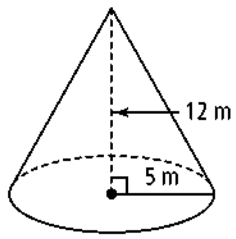
$B = \pi \cdot \square^2 = \square\ \text{mm}^2$

**13.** 

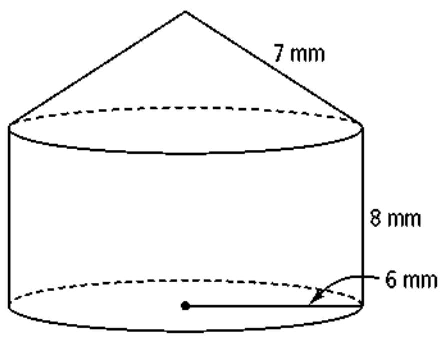

**14.** 


**Find the lateral area of each cone to the nearest whole number.**

**15.** 


**16.** 


**17.** Find the surface area of the figure at the right to the nearest whole number. (*Hint:* Add the base, the lateral area of the cylinder, and the lateral area of the cone.)




**18.** The lateral area of a cone is $60\pi\ \text{m}^2$. The slant height is 15 m. What is the radius?

**19.** The surface area of a cone is $55\pi\ \text{cm}^2$. The radius is 5 cm. What is the slant height?

Name______________________________Class____________Date____________

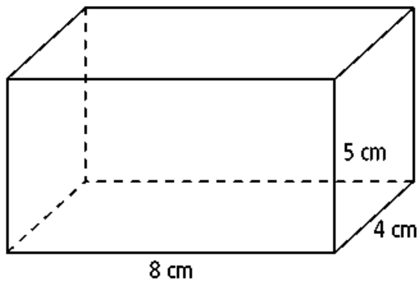
# 11-4 Practice

*Form K*

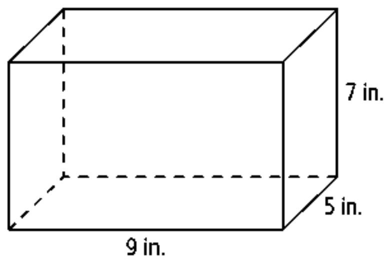
## Volumes of Prisms and Cylinders

**Find the volume of each rectangular prism.**

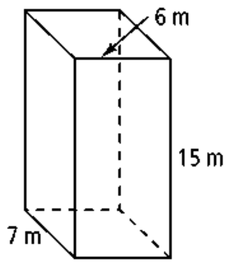
**1.**



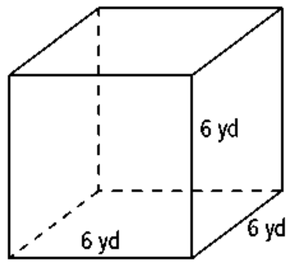

**2.**




**3.**




**4.**




**5.** The base is a square, 9.6 cm on a side. The height is 6.2 cm.

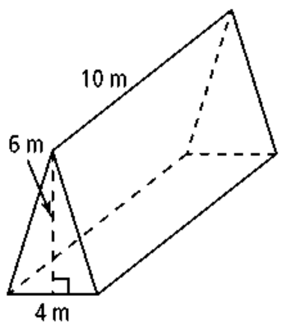
**6.** The base is a rectangle with length 4.7 cm and width 7.5 cm. The height is 6.1 cm.

**Find the volume of each triangular prism to the nearest tenth.**

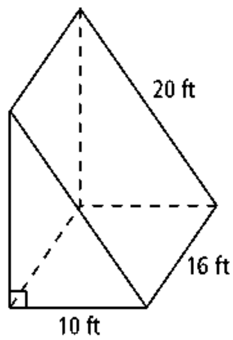
To start, use the formula for the volume of a triangular prism and the formula for the base area of a triangle.

$V = BH, B = \frac{1}{2}bh$

**7.**




**8.**




**9.** The base is a right triangle with a leg of 8 in. and hypotenuse of 10 in. The height of the prism is 15 in. (*Hint:* Use the Pythagorean Theorem to find the length of the other leg.)

**10.** The base is a 30°-60°-90° triangle with a hypotenuse of 14 m. The height of the prism is 11 m. Find the volume to the nearest tenth.

Name_________________________________Class ____________ Date____________

# 11-4 Practice (continued) *Form K*

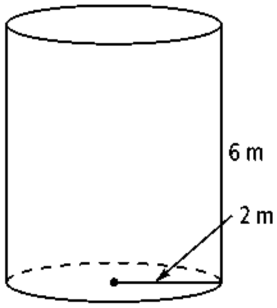
## Volumes of Prisms and Cylinders

**Find the volume of each cylinder in terms of $\pi$ and to the nearest tenth.**

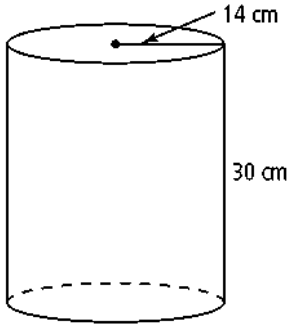
To start, use the formula for the volume of a cylinder, then identify the variables and any given values.

$V = \pi r^2 h$

**11.**




**12.**

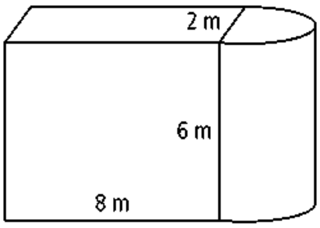



**13.** The radius of the right cylinder is 6.3 cm. The height is 14.5 cm.

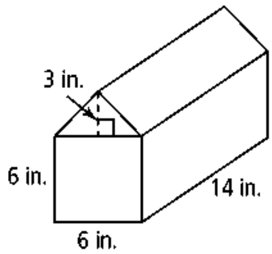
**14.** The diameter of the right cylinder is 16 ft. The height is 7 ft.

**Find the volume of each composite figure to the nearest whole number.**

**15.**

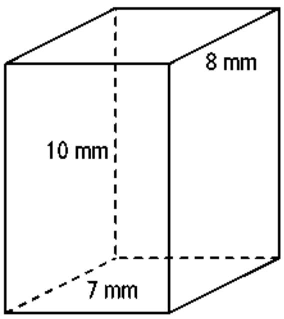



**16.**

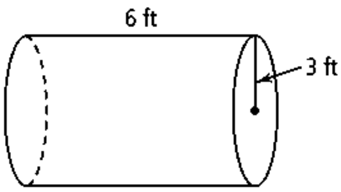



**Find the volume of each figure to the nearest tenth.**

**17.**

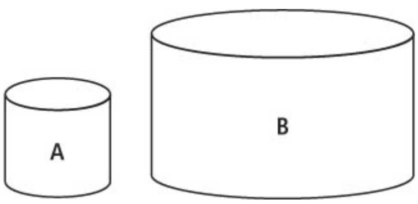



**18.**




**19.** A cylindrical weather satellite has a diameter of 10 ft and a height of 6 ft. What is the volume available for carrying instruments and computer equipment, to the nearest tenth of a cubic foot?

**20.** Can A has a diameter of 6 cm and a height of 6.5 cm. Can B has a diameter of 16 cm and a height of 11.5 cm. What is the difference in volume of the two can types, to the nearest cubic centimeter?



Name_____________________________________ Class _____________ Date______________

# 11-5 Practice

*Form K*

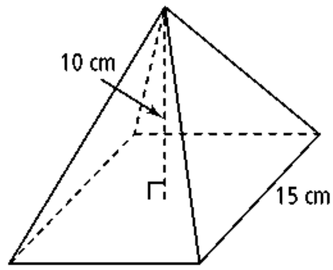
## Volumes of Pyramids and Cones

**Find the volume of each square pyramid. Round to the nearest tenth if necessary.**

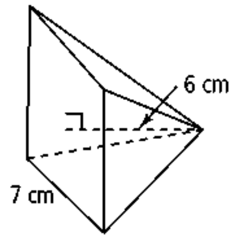
To start, use the formula for the volume of a pyramid. Then find the area of the base of the pyramid.

$V = \frac{1}{3}Bh$

**1.**



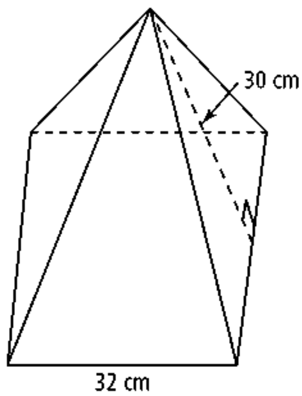

**2.**



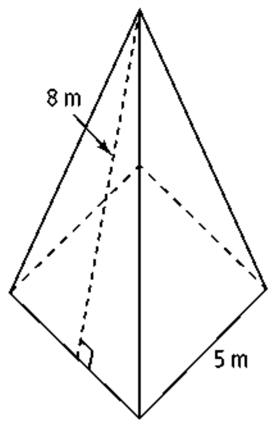

**Find the volume of each square pyramid, given its slant height. Round to the nearest whole number.**

To start, find the height of the pyramid using the Pythagorean Theorem. Then use the formula for the volume of a pyramid.

**3.**




**4.**

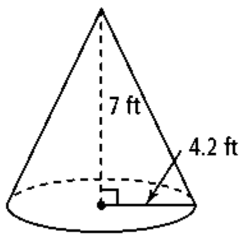



**5.** The base of a pyramid is a square, 24 cm on a side. The height is 13 cm. Find the volume.

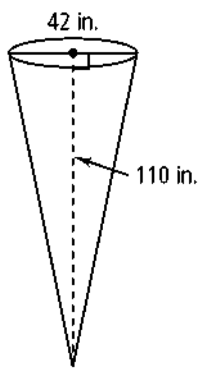
**6.** The base of a pyramid is a square, 14 cm on a side. The height of the pyramid is 25 cm. Find the volume to the nearest whole number.

**Find the volume of each cone in terms of $\pi$ and also rounded as indicated.**

**7.** nearest cubic foot




**8.** nearest cubic inch




**9.** The base has a radius of 8 cm and a height of 5 cm. Round to the nearest cubic centimeter.

**10.** The base has a diameter of 20 m and a height of 12.6 m. Round to the nearest cubic meter.

Name______________________________________ Class _____________Date_______________

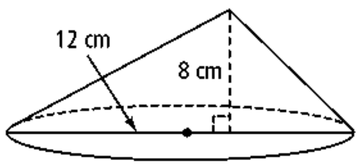
# 11-5 Practice (continued)

*Form K*

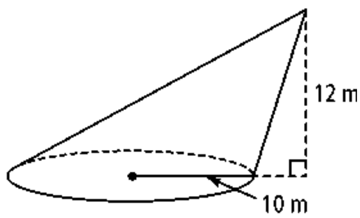
## Volumes of Pyramids and Cones

**Find the volume of each figure to the nearest whole number.**

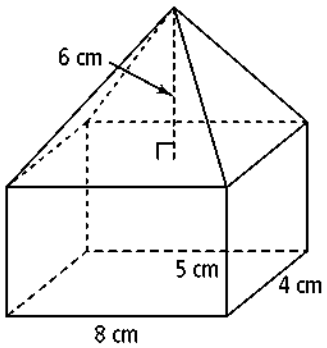
**11.**



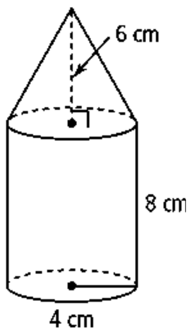

**12.**




**13.**




**14.**

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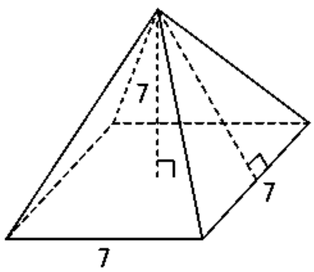
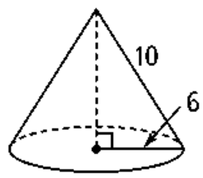



**16.**




**17.** One right circular cone is set inside a larger right circular cone. Find the volume of the space between the cones if the diameter of the inside cone is 9 in., the diameter of the outside cone is 15 in., and the height of both is 8 in. Round to the nearest tenth.

**18.** The Pyramid of Khufu is a square pyramid which had a side length of about 230 m and a height of about 147 m when it was completed. The Pyramid of Khafre had a side length of about 215 m and a height of about 144 m when it was completed. What was the approximate difference in the volume of the two pyramids upon completion?

Name ______________________________ Class ______________ Date __________

# 11-6 Practice

*Form K*

## Surface Areas and Volumes of Spheres

**Find the surface area of the sphere with the given diameter or radius. Leave your answer in terms of $\pi$.**

**1.** $r = 6$ ft

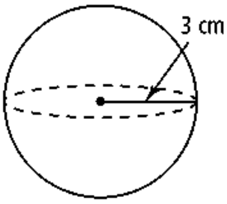
**2.** $d = 10$ cm

**3.** $r = 8$ in.

**4.** $d = 4$ yd

**Find the surface area of each sphere. Leave each answer in terms of $\pi$.**

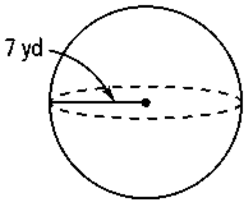
**5.**



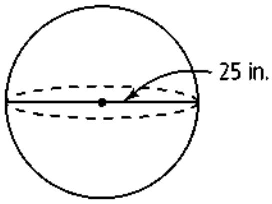

To start, use the formula for the surface area of a sphere. Then determine the radius and substitute it into the formula.

S.A. $= 4\pi r^2 = 4\pi \cdot \square^2$

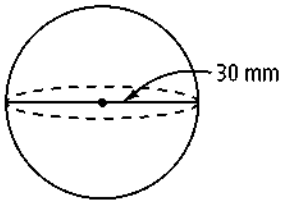
**6.**




**7.**




**8.**




**Use the given circumference to find the surface area of each spherical object. Round your answer to the nearest tenth.**

**9.** a baseball with $C = 9.25$ in.

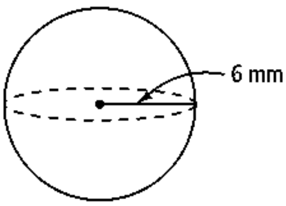
**10.** a softball with $C = 28.25$ cm

**11.** a basketball with $C = 2.98$ ft

**12.** a bowling ball with $C = 26.7$ in.

**Find the volume of each sphere. Give each answer in terms of $\pi$ and rounded to the nearest cubic unit.**

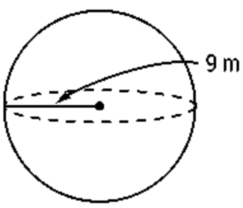
**13.**



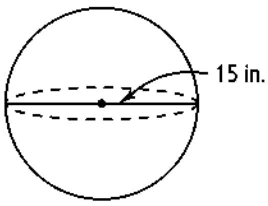

To start, use the formula for the surface area of a sphere. Then determine the radius, and substitute it into the formula.

$V = \frac{4}{3}\pi r^3 = \frac{4}{3}\pi \cdot \square^3$

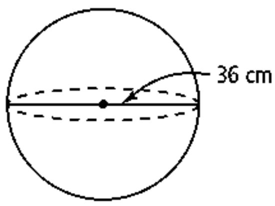
**14.**




**15.**




**16.**



# 11-6 Practice (continued)

*Form K*

## Surface Areas and Volumes of Spheres

**A sphere has the volume given. Find its surface area to the nearest whole number.**

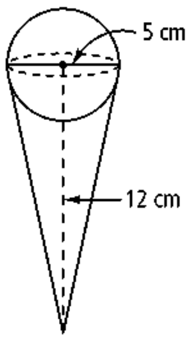
**17.** $V = 14{,}130\text{ ft}^3$

**18.** $V = 4443\text{ m}^3$

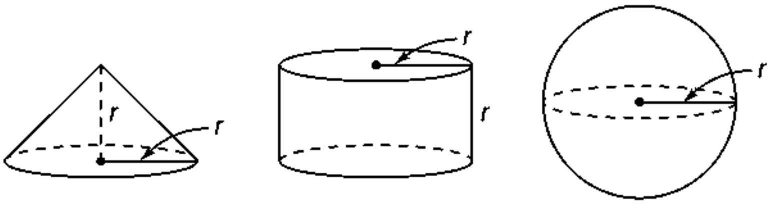
**19.** $V = 100\text{ in.}^3$

**20.** $V = 31{,}400\text{ mi}^3$

**21.** A spherical scoop of ice cream with a diameter of 5 cm rests on top of a sugar cone that is 12 cm deep and has a diameter of 5 cm. If all of the ice cream melts into the cone, what percent of the cone will be filled? Round to the nearest percent.




**22. Writing** A cylinder, a cone, and a sphere have the dimensions indicated in the diagram below.




**a.** What are the formulas for the volume of the cone and the volume of the cylinder in terms of *r*? Express each answer in terms of π.

**b.** If $r = 9$ in., what are the volumes of the cone, cylinder, and sphere?

**c.** How are the volumes related?

**d.** How can you show that this relationship is true for all values of *r*?

**23.** A bowling ball must have a diameter of 8.5 in. If the bowling ball weighs 16 lb, find the density ($\text{lb/in.}^3$) of the bowling ball. Density is the quotient of weight divided by volume. Round your answer to the nearest hundredth.

**24. Open-Ended** Draw two spheres such that the volume of one sphere is eight times the volume of the other sphere.

Name________________________________Class_____________ Date ____________

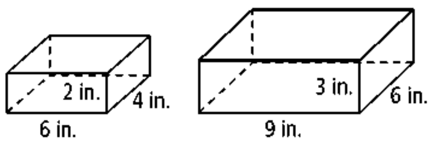
# 11-7 Practice

*Form K*

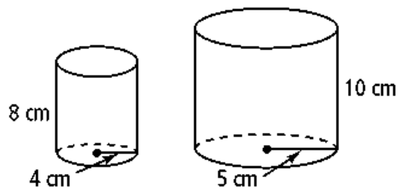
## Areas and Volumes of Similar Solids

**Are the two figures similar? If so, give the scale factor of the first figure to the second figure.**

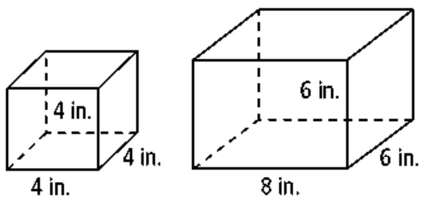
**1.**



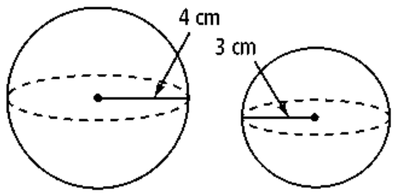

**2.**




**3.**




**4.**

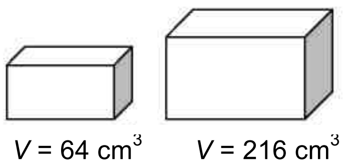



**5.** two cubes, one with 6-in. edges, the other with 8-in. edges

**6.** a cylinder and a cone, each with 9-m radii and 5-m heights

**Each pair of figures is similar. Use the given information to find the scale factor of the smaller figure to the larger figure.**

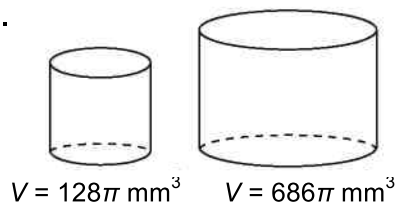
**7.**



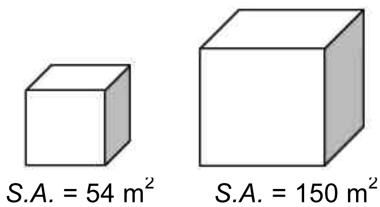

To start, write a proportion using the ratio of the volumes of the solids.

$$\frac{a^3}{b^3} = \frac{64}{216}$$

**8.**




**9.**




**10.** Two similar cones have heights 4 m and 12 m.
- **a.** What is their scale factor?
- **b.** What is the ratio of their surface areas?
- **c.** What is the ratio of their volumes?

**11.** A shipping box holds 450 golf balls. A larger shipping box has dimensions triple the size of the other box. How many golf balls does the larger box hold?

# 11-7 Practice (continued)

*Form K*

## Areas and Volumes of Similar Solids

**The surface areas of two similar figures are given. The volume of the larger figure is given. Find the volume of the smaller figure.**

**12.** S.A. = 94 $m^2$
S.A. = 846 $m^2$
$V$ = 1620 $m^3$

To start, find the scale factor $a : b$.

$$\frac{a^2}{b^2} = \frac{\square}{\square}$$

**13.** S.A. = 240 $m^2$
S.A. = 1500 $m^2$
$V$ = 1562.5 $m^3$

**14.** S.A. = 96 $in.^2$
S.A. = 216 $in.^2$
$V$ = 216 $in.^3$

**The volumes of two similar figures are given. The surface area of the larger figure is given. Find the surface area of the smaller figure.**

**15.** $V$ = 384 $m^3$
$V$ = 10,368 $m^3$
S.A. = 3168 $m^2$

**16.** $V$ = 216 $in.^3$
$V$ = 1728 $in.^3$
S.A. = 864 $in.^2$

**17.** A cylindrical thermos has a radius of 3 in. and is 12 in. high. It holds 20 fl oz. To the nearest ounce, how many ounces will a similar thermos with a radius of 4 in. hold?

**18.** You have a set of three similar gift boxes. Each box is a rectangular prism. The large box has 15-cm base edges. The medium box has 10-cm base edges. The small box has 5-cm base edges. How does the volume of each box compare to every other box?

**19.** A baseball and a softball are similar in shape. The baseball has a radius of 1.25 in. and a volume of 8.18 $in.^3$. If the volume of a softball is 65.44 $in.^3$, what is the radius of the softball?

**20. Error Analysis** A classmate says that a rectangular prism that is 9 cm long, 12 cm wide, and 15 cm high is similar to a rectangular prism that is 12 cm long, 16 cm wide, and 21 cm high. Explain your classmate's error.

**21.** The volumes of two similar prisms are 512 $ft^3$ and 8000 $ft^3$.

**a.** Find the ratio of their heights.

**b.** Find the ratio of the area of their bases.