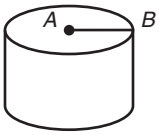
Name _____ Class _____ Date _____

Reteaching 9-1

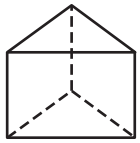
Solids

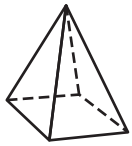
These three-dimensional figures are space figures, or *solids*.



cylinder

cone


prism

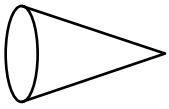

pyramid

A *cylinder* has two congruent circular bases. $\overline{AB}$ is a radius.

A *cone* has one circular base. $\overline{CD}$ is a diameter.

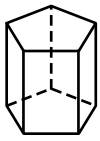
A *prism* has two bases that are congruent and parallel. The lateral faces are parallelograms. A *pyramid* has one base. The lateral faces are triangles. The shape of a base is used to name the solid. A triangular prism and a square pyramid are shown above.

For each figure, describe the base(s) and name the figure.

1. 

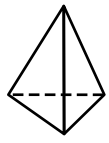
circle

cone

2. 

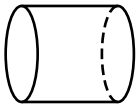
pentagon

pentagonal prism

3. 

triangle

triangular pyramid

4. 

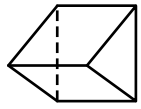
circle

cylinder

5. 

square

square pyramid

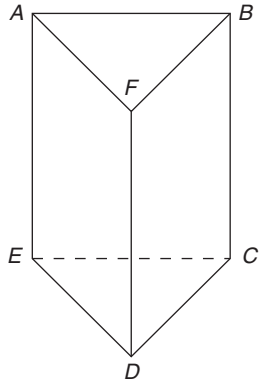
6. 

triangle

triangular prism

For the figure, name a pair of parallel lines and a pair of intersecting lines.

7. Sample answer: $\overleftrightarrow{AE}$ and $\overleftrightarrow{BC}$; $\overleftrightarrow{AF}$ and $\overleftrightarrow{FD}$



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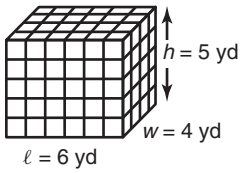
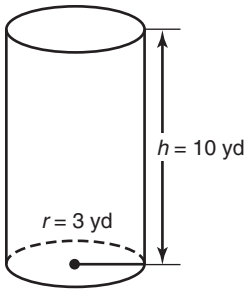
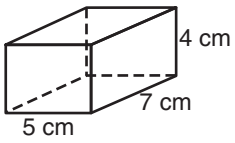
Reteaching 9-2

Volume of Prisms and Cylinders

To find the volume of a prism or a cylinder, multiply the base area B and the height h.

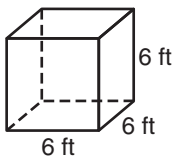
	① Find the base area B.	② Multiply base area B and height h. $V = Bh$
	$B = \ell w$ $= 6 \cdot 4$ $= 24 \text{ yd}^2$	$V = Bh$ $= 24 \cdot 5$ $= 120 \text{ yd}^3$ The volume is 120 yd^3.
	$B = \pi r^2$ $= \pi \cdot 3^2$ $\approx 28.26 \text{ yd}^2$	$V = Bh$ $\approx 28.26 \text{ yd}^2 \times 10$ $\approx 282.6 \text{ yd}^3$ The volume is about 283 yd^3.

Find the base area and volume of each prism.

1. 

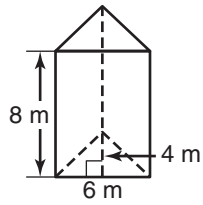
$B =$ 35 cm² _____

$V =$ 140 cm³ _____

2. 

$B =$ 36 ft² _____

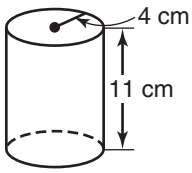
$V =$ 216 ft³ _____

3. 

$B =$ 12 m² _____

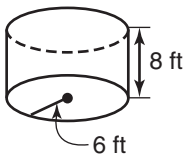
$V =$ 96 m³ _____

Find the base area of each cylinder to the nearest hundredth. Then find the volume of each cylinder to the nearest cubic unit.

4. 

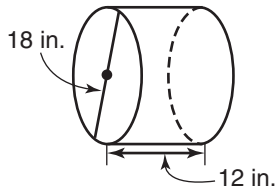
$B \approx$ 50.24 cm² _____

$V \approx$ 553 cm³ _____

5. 

$B \approx$ 113.04 ft² _____

$V \approx$ 904 ft³ _____

6. 

$B \approx$ 254.34 in.² _____

$V \approx$ 3,052 in.³ _____

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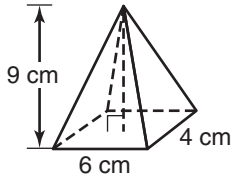
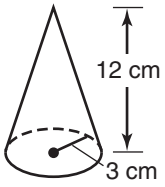
Reteaching 9-3

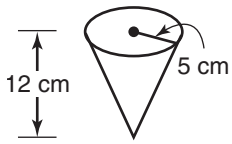
Volumes of Pyramids and Cones

To find the volume of a pyramid or cone, multiply $\frac{1}{3}$, the base area B, and the height h.

	① Find the base area B.	② Multiply $\frac{1}{3}$, the base area B, and the height h. $V = \frac{1}{3}Bh$
	$B = \ell w$ $= 6 \cdot 4$ $= 24 \text{ cm}^2$	$V = \frac{1}{3}Bh$ $= \frac{1}{3}(24)(9)$ $= 72 \text{ cm}^3$ The volume is 72 cm^3.
	$B = \pi r^2$ $= \pi \cdot 3^2$ $\approx 28.26 \text{ cm}^2$	$V = \frac{1}{3}Bh$ $\approx \frac{1}{3}(28.26)(12)$ $\approx 113.04 \text{ cm}^3$ The volume is about 113 cm^3.

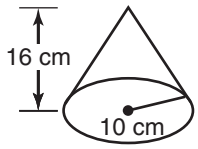
Find the volume of each figure to the nearest whole cubic unit.

1.



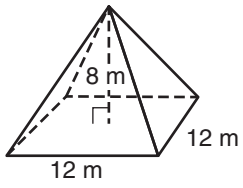
314 cm^3

2.



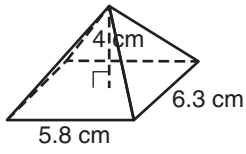
1,675 cm^3

3.



384 m^3

4.



49 cm^3

5. Find the height of a cone with an approximate volume of 134 cm^3 and a radius of 4 cm.

8 cm

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Reteaching 9-4

Spheres

Find the surface area and volume of a beach ball with a radius of 8 inches.

The *surface area* of a sphere is four times the product of π and the square of the radius r.

$S.A. = 4\pi r^2$ ← Surface area of a sphere
$= 4\pi(8^2)$ ← Substitute.
$= 256\pi$ ← Simplify.
≈ 804 ← Use a calculator.

The surface area of the beach ball is about 804 $in.^2$.

The *volume* of a sphere is four-thirds of the product of π and the radius r cubed.

$V = \frac{4}{3}\pi r^3$ ← Volume of a sphere
$= \frac{4}{3}\pi(8^3)$ ← Substitute.
$= \frac{2{,}048}{3}\pi$ ← Simplify.
$\approx 2{,}145$ ← Use a calculator.

The volume of the beach ball is about 2.145 $in.^3$.

A glass blower sells opalescent glass spheres. Find the surface area and volume of each sphere to the nearest whole number.

1. blue: $r = 2$ in.

S.A. ≈ 50 $in.^2$; $V \approx 34$ $in.^3$

2. green: $d = 9$ cm

S.A. ≈ 254 cm^2; $V \approx 382$ cm^3

3. yellow: $d = 6$ in.

S.A. ≈ 113 $in.^2$; $V \approx 113$ $in.^3$

4. multicolored: $r = 3.5$ in.

S.A. ≈ 154 $in.^2$; $V \approx 180$ $in.^3$

5. clear: $r = 6.3$ cm

S.A. ≈ 499 cm^2; $V \approx 1{,}047$ cm^3

6. opaque: $d = 8.5$ in.

S.A. ≈ 227 $in.^2$; $V \approx 321$ $in.^3$

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Reteaching 9-5

Exploring Similar Solids

Two solids are *similar solids* if they have the same shape and all of their corresponding lengths are proportional. A special relationship exists among the measures of similar solids:

- The ratios of the corresponding dimensions of similar solids is $\frac{a}{b}$.
- The ratio of their surface areas is $\frac{a^2}{b^2}$.
- The ratio of their volumes is $\frac{a^3}{b^3}$.

Example: Two similar cylindrical watering cans have diameters of 14 in. and 18 in. Find the volume of the larger watering can if the volume of the smaller watering can is 882 in.^{3}.

① Write the ratio of corresponding dimensions.

$\frac{14}{18} = \frac{7}{9}$, so the ratio of the volumes is $\frac{a^3}{b^3} = \frac{7^3}{9^3}$, or $\frac{343}{729}$.

② Write a proportion: $\frac{\text{volume of small watering can}}{\text{volume of large watering can}} = \frac{343}{729}$

$\frac{882}{x} = \frac{343}{729}$ ← Substitute the known volume.

$343x = (882)(729)$ ← Cross multiply.

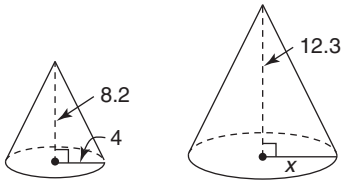
$343x = 642{,}978$ ← Divide both sides by 343.

$x = 1{,}874.57$ ← Simplify.

The volume of the larger watering can is about 1,875 in.^{3}.

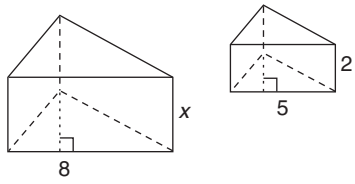
For each pair of similar solids find the value of the variable.

1.



$x = 6$

2.



$x = 3.2$

3. A triangular prism has a height of 18 cm, surface area of 463 cm^2, and volume of 279 cm^3. Find the surface area and volume of a similar prism with a height of 12 cm. Round your answers to the nearest whole number.

206 cm^2; 83 cm^3

4. A rectangular prism has a height of 24 inches, a surface area of 1,088 in.^{2} and a volume of 2,112 in.^{3}. Find the surface area and volume of a similar prism with a height of 36 in.

2,448 in.^{2}; 7,128 in.^{3}