11.5 Start Thinking

Consider the stack of coins shown in Figure A. What is the volume of the cylinder formed by the stack of coins? The same coins are stacked as shown in Figure B. What is the volume of this new cylinder? Did the height of the stack change? Did the volume change? What conclusion can you make about the volume of a cylinder, right or oblique?

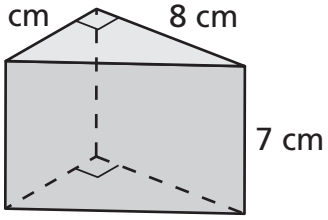
Figure A

Figure B

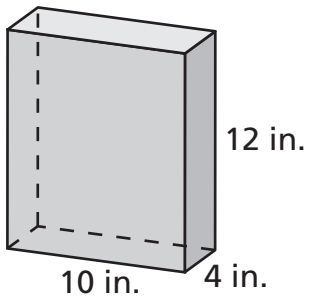
11.5 Warm Up

Find the volume of the solid.

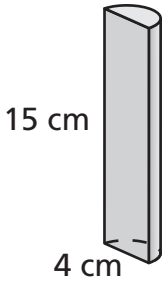
1.



2.



3.



11.5 Cumulative Review Warm Up

Use a calculator to find the trigonometric ratio. Round your answer to four decimal places.

1. sin 139°

2. sin 98°

3. tan 165°

4. cos 122°

5. cos 173°

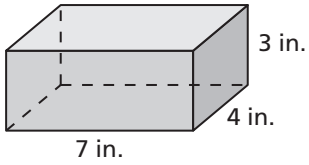
6. tan 103°

Name_____ Date _____

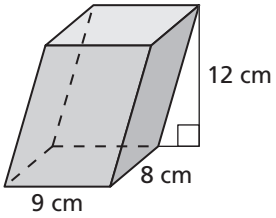
11.5 Practice A

In Exercises 1 and 2, find the volume of the prism.

1.

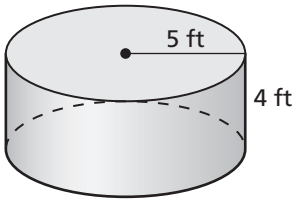


2.

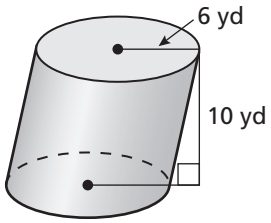


In Exercises 3 and 4, find the volume of the cylinder.

3.



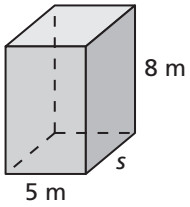
4.



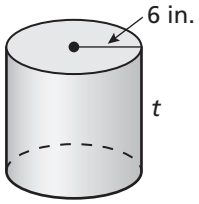
5. A cylindrical container with a radius of 12 centimeters is filled to a height of 6 centimeters with coconut oil. The density of coconut oil is 0.92 gram per cubic centimeter. What is the mass of the coconut oil to the nearest gram?

In Exercises 6 and 7, find the missing dimension.

6. Volume $= 240 \text{ m}^3$



7. Volume $= 1244 \text{ in.}^3$

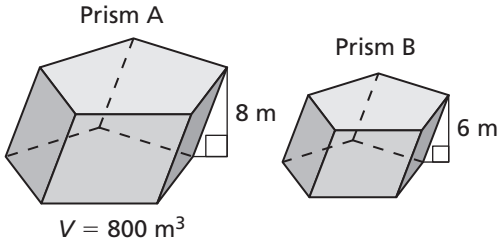


In Exercises 8 and 9, find the area of the base of the rectangular prism with the given volume and height. Then give a possible length and width.

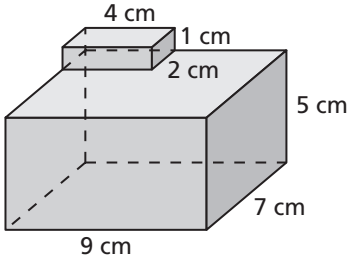
8. $V = 96 \text{ ft}^3$, $h = 8 \text{ ft}$

9. $V = 144 \text{ cm}^3$, $h = 6 \text{ cm}$

10. The prisms are similar. Find the volume of Prism B.



11. Find the volume of the composite solid.

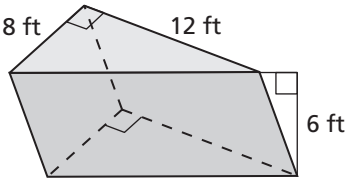


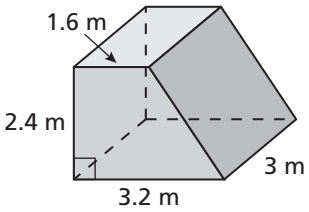
12. A cylindrical swimming pool is approximately 12 feet wide and 4 feet deep. About how many gallons of water does the swimming pool contain? Remember that 1 cubic foot is approximately 7.48 gallons.

Name _____ Date _____

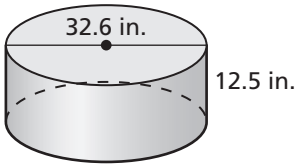
11.5 Practice B

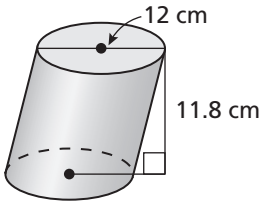
In Exercises 1 and 2, find the volume of the prism.

1. 

2. 

In Exercises 3 and 4, find the volume of the cylinder.

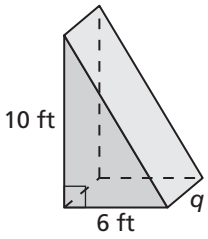
3. 

4. 

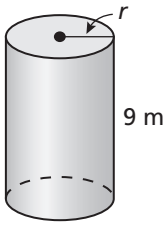
5. A cylindrical container with a radius of 8 centimeters is filled to a height of 10 centimeters with sulfuric acid. The density of sulfuric acid is 1.84 grams per cubic centimeter. What is the mass of the sulfuric acid to the nearest gram?

In Exercises 6 and 7, find the missing dimension.

6. Volume $= 120$ ft^3



7. Volume $= 254.5$ m^3

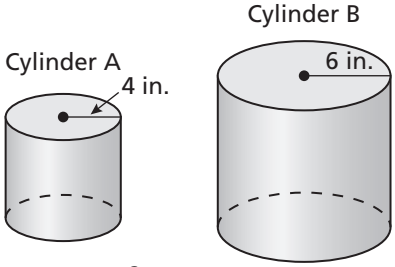


In Exercises 8 and 9, find the area of the base of the rectangular prism with the given volume and height. Then give a possible length and width.

8. $V = 216$ yd^3, $h = 12$ yd

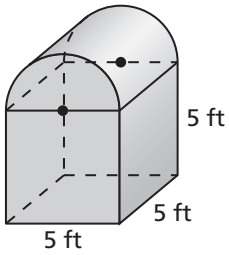
9. $V = 448$ in.^{3}, $h = 14$ in.

10. The cylinders are similar. Find the volume of Cylinder B.



$V = 112\pi$ in.^{3}

11. Find the volume of the composite solid.



12. An aquarium shaped like a rectangular prism has a length of 24 inches, a width of 12 inches, and a height of 18 inches. You fill the aquarium half full with water. When you submerge a rock in the aquarium, the water level rises 0.5 inch. Find the volume of the rock.

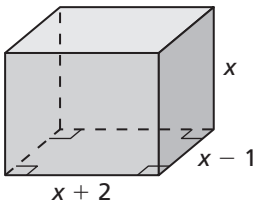
Name_____ Date _____

11.5 Enrichment and Extension

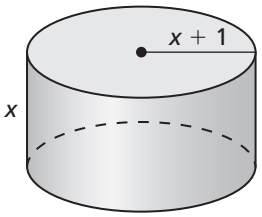
Volumes of Prisms and Cylinders

Find the volume of the three-dimensional figure in terms of *x*.

1.



2.

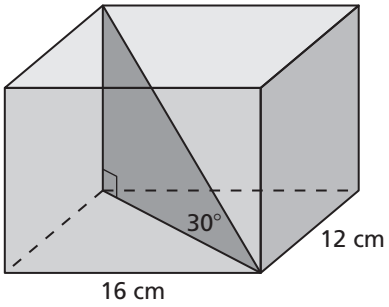


3. A rectangular prism has a volume of 720 cubic centimeters. Its surface area is 484 square centimeters and the edge lengths are consecutive integers. Determine the longest segment that can be drawn to connect two vertices.

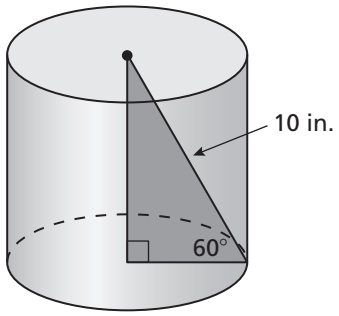
4. The volume in cubic units of a cylinder is equal to its surface area in square units. Prove that the radius and height must both be greater than 2.

In Exercises 5 and 6, find the volume of the right prism or right cylinder.

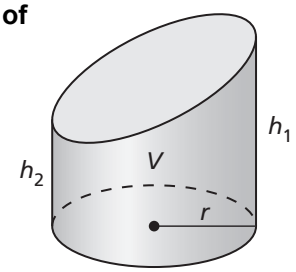
5.



6.



In Exercises 7–9, the figure is a cylinder with an oblique face. The volume *V* of such a cylinder is given by $V = \frac{\pi r^2}{2}(h_1 + h_2)$.



7. Find the volume of a cylinder with an oblique face in which $r = 8$ centimeters, $h_1 = 13$ centimeters, and $h_2 = 10$ centimeters.

8. Find the radius of a cylinder with an oblique face in which $V = 300\pi$ cubic inches, $h_1 = 13$ inches, and $h_2 = 11$ inches.

9. Find h_2 of a cylinder with an oblique face in which $V = 88\pi$ cubic feet, $r = 4$ feet, and $h_1 = 6$ feet.

Name _____ Date _____

11.5 Puzzle Time

What Starts With A "P," Ends With An "E," And Has One Million Letters In It?

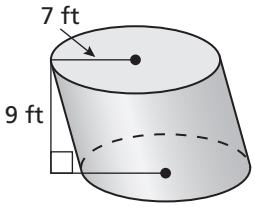
Write the letter of each answer in the box containing the exercise number.

Complete the sentence.

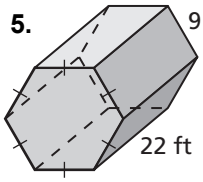
1. The _____ of a solid is the number of cubic units contained in its interior.
2. _____ Principle states that if two solids have the same height and the same cross-sectional area at every level, then they have the same volume.
3. _____ is the amount of matter that an object has per unit volume.

Find the volume in square feet of the figure. Round your answer to the nearest hundredth.

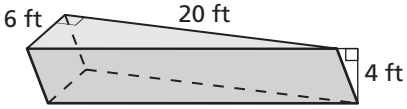
4.



5.

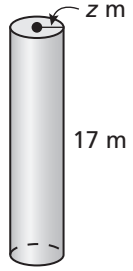


6.



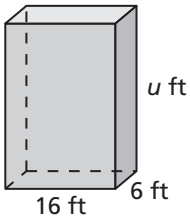
Find the value of the variable.

7.



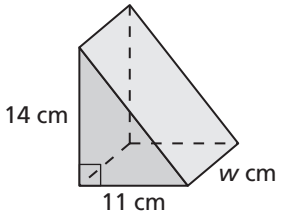
$V = 213.52 \text{ m}^3$

8.



$V = 2304 \text{ ft}^3$

9.



$V = 770 \text{ cm}^3$

10. An element has a volume of 20.2 cubic centimeters and a mass of 121.2 grams. Find the density (in grams per cubic centimeter).

4	6	8	3		5	9	2	10	7	1

Answers

E. volume
I. 6
J. area
O. 4629.77
P. Shepherd's
Q. 16
S. 24
T. 5
F. Cavalieri's
C. 2
D. mass
E. 1440
F. 15
O. 240
P. 1385.44
T. density
U. 2202.5
F. 10
G. 2315.82
P. 1384.74