Name _____ Date _____

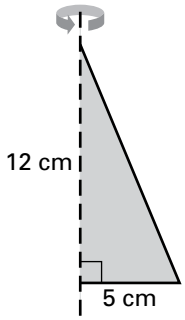
LESSON 11.7

Challenge Practice

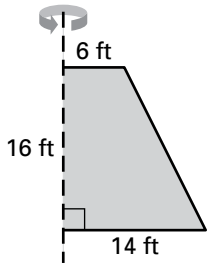
For use with the lesson "Volume of Pyramids and Cones"

1. What is the height of a cone whose slant height is twice the radius and whose volume is $\frac{343\pi\sqrt{3}}{24}$ cubic inches?

2. Consider a right triangle rotated 360° about one of its legs as shown at the right. What solid is formed? What is its volume?

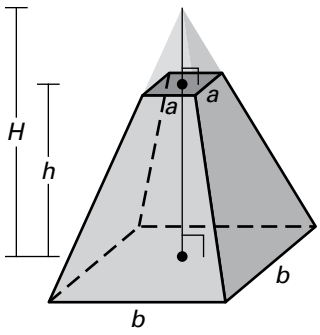


3. Consider a trapezoid rotated 360° about one of its sides as shown at the right. What solid is formed? What is its volume?



In Exercises 4–7, use the following information.

The *frustum* of a pyramid is formed by cutting the top off of a pyramid, with a cut parallel to the base. Consider the pyramid with a square base shown at the right.



4. Derive a formula for finding the volume V of a frustum of a pyramid with a square base. The formula should be in terms of a, b, H, and h.

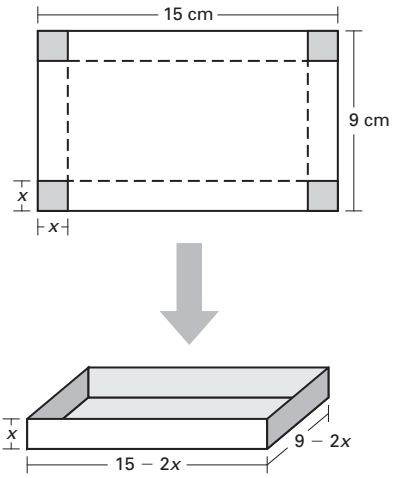
5. The cut surface is similar to the original pyramid. Set up a proportion relating the heights and side lengths of the similar pyramids. Solve the original proportion for H in terms of a, b, and h. Then solve the original proportion again for $H - h$ in terms of a, b, and h.

6. Use your results of Exercise 5 to rewrite the formula in Exercise 4 in terms of a, b, and h.

7. Find the volume of a frustum of a pyramid with a square base in which $a = 6$ meters, $b = 9$ meters, and $h = 16$ meters.

Lesson 11.6 Volume of Prisms and Cylinders, continued

6. a.



b. $V = x(9 - 2x)(15 - 2x) = 4x^3 - 48x + 135$

c.

x	0.8	1.2	1.8	2.0	2.2	2.6
V	79.3	99.8	110.8	110	107.3	96.8

Length: 11.4 cm; width: 5.4 cm; height: 1.8 cm

Lesson 11.7 Volume of Pyramids and Cones

Teaching Guide

1. 9 **2.** about 848.2 ft^3 **3.** about 31.4 yd^3

4. The contractor only needs 25 cubic yards and has 31.4 cubic yards available. **5.** No; There is about 22 cubic yards of gravel, so there is not enough.

Practice Level A

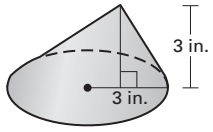
1. $9\sqrt{3} \approx 15.6$ square units **2.** 64 square units
3. $16\pi \approx 50.3$ square units **4.** 400 yd^3 **5.** 20 m^3
6. 65.33 $in.^3$ **7.** 336 cm^3 **8.** 86.6 ft^3
9. 249.42 cm^3 **10.** 100.53 $in.^3$ **11.** 287.98 cm^3
12. 75.40 mm^3 **13.** 117.29 yd^3 **14.** 314.16 ft^3
15. 25.13 m^3 **16.** $x = 10$ cm **17.** $x = 5$ ft
18. $x = 11$ m **19.** 8 ft **20.** 1005.31 m^3
21. 17.34 ft^3 **22.** 638.98 cm^3 **23.** 323.04 yd^3
24. 79.52 cm^3 **25.** about 6.77 ft

Practice Level B

1. 100.53 cm^3 **2.** 20 $in.^3$ **3.** 10.67 cm^3
4. 414.69 m^3 **5.** 126 $in.^3$ **6.** 163.49 cm^3
7. 6 in. **8.** 7 cm **9.** 7 m **10.** C
11. 2035.75 cm^3 **12.** 3681.88 m^3 **13.** 2652.53 ft^3
14. 448 m^3 **15.** 90.93 $in.^3$ **16.** 144 cm^3
17. 190.87 mm^3 **18.** 103.67 $in.^3$
19. 122.67 cm^3 **20.** 12 ft **21.** 1520.53 ft^3
22. 56.32 yd^3 **23.** no

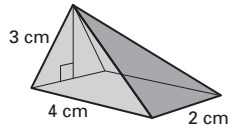
Practice Level C

1.



28.27 $in.^3$

2.



8 cm^3

3. 169.76 m^3 **4.** 6.58 ft^3 **5.** 124.05 cm^3
6. 14.76 yd^3 **7.** 4,579,109.32 m^3 **8.** 50.20 $in.^3$
9. 2211.8 cm^3 **10.** 29,605.40 mm^3
11. 353.97 m^3 **12.** 10 yd **13.** 502.81 m^3
14. 181.83 $in.^3$ **15.** 178.63 cm^3 **16.** 963.4 cm^3
17. 24 $in.^3$ **18.** No, each cone would require about 5.06 grams of gold. For all twelve, the jeweler would need about 60.7 grams.
19. 1840 $in.^3$ **20.** $533\frac{1}{3}m^3$

Study Guide

1. $V = 156$ yd^3 **2.** $h = 17$ m **3.** $V = 207.9$ $in.^3$

Problem Solving Workshop: Worked Out Example

1. 11.5 in. **2.** 1.61 in. **3.** 42.41 $in.^2$

Challenge Practice

1. $\frac{7\sqrt{3}}{2} \approx 6.1$ in. **2.** Cone; $100\pi \approx 314.2$ cm^3

3. Frustum of a cone; $\frac{5056\pi}{3} \approx 5294.6$ ft^3

4. $V = \frac{1}{3}b^2H - \frac{1}{3}a^2(H - h)$

5. $\frac{H}{b} = \frac{H - h}{a}$; $H = \frac{bh}{b - a}$; $H - h = \frac{ah}{b - a}$

6. $V = \frac{1}{3}h(a^2 + ab + b^2)$ **7.** 912 m^3