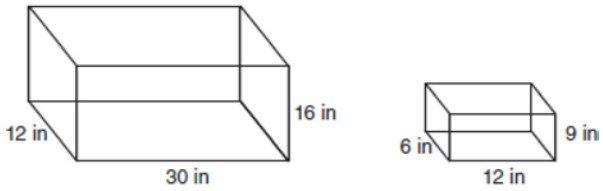
A.G.2: Volume 1: Use formulas to calculate volume and surface area of rectangular solids and cylinders

1 Lenny made a cube in technology class. Each edge measured 1.5 cm. What is the volume of the cube in cubic centimeters?
1) 2.25
2) 3.375
3) 9.0
4) 13.5

2 How many cubes with 5-inch sides will completely fill a cube that is 10 inches on a side?
1) 50
2) 25
3) 8
4) 4

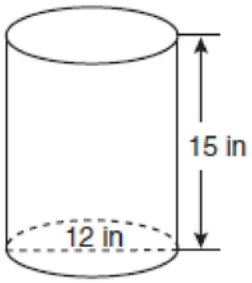
3 A rectangular tank measures 5 feet long, 4 feet wide, and 3 feet high. Water is poured into the tank to a depth of $2\frac{1}{2}$ feet. How many cubic feet of water are in the tank?
1) 60
2) 50
3) 15.5
4) 11.5

4 The diagram below represents Joe's two fish tanks.



Joe's larger tank is completely filled with water. He takes water from it to completely fill the small tank. Determine how many cubic inches of water will remain in the larger tank.

5 A cylindrical container has a diameter of 12 inches and a height of 15 inches, as illustrated in the diagram below.



(Not drawn to scale)

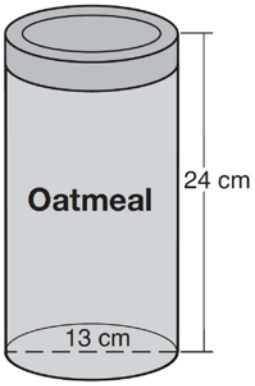
What is the volume of this container to the *nearest tenth* of a cubic inch?
1) 6,785.8
2) 4,241.2
3) 2,160.0
4) 1,696.5

Name: _____

6 A cylinder has a circular base with a radius of 3 units and a height of 7 units. What is the volume of the cylinder in cubic units?
1) 2π
2) 42π
3) 63π
4) 147π

7 A cylinder has a diameter of 10 inches and a height of 2.3 inches. What is the volume of this cylinder, to the *nearest tenth of a cubic inch*?
1) 72.3
2) 83.1
3) 180.6
4) 722.6

8 Oatmeal is packaged in a cylindrical container, as shown in the diagram below.



The diameter of the container is 13 centimeters and its height is 24 centimeters. Determine, in terms of π, the volume of the cylinder, in cubic centimeters.

9 A thermos in the shape of a cylinder is filled to 1 inch from the top of the cylinder with coffee. The height of the cylinder is 12 inches and its radius is 2.5 inches. State, to the *nearest hundredth of a cubic inch*, the volume of coffee in the thermos.

10 Mike buys his ice cream packed in a rectangular prism-shaped carton, while Carol buys hers in a cylindrical-shaped carton. The dimensions of the prism are 5 inches by 3.5 inches by 7 inches. The cylinder has a diameter of 5 inches and a height of 7 inches. Which container holds more ice cream? Justify your answer. Determine, to the *nearest tenth of a cubic inch*, how much more ice cream the larger container holds.

11 The volume of a cylindrical can in 32π cubic inches. If the height of the can is 2 inches, what is its radius, in inches?
1) 8
2) 2
3) 16
4) 4

12 A soup can is in the shape of a cylinder. The can has a volume of 342 cm^3 and a diameter of 6 cm. Express the height of the can in terms of π. Determine the maximum number of soup cans that can be stacked on their base between two shelves if the distance between the shelves is exactly 36 cm. Explain your answer.

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Answer Section

1 ANS: 2

$1.5^3 = 3.375$

REF: 060809ia

2 ANS: 3

$\frac{10^3}{5^3} = \frac{1000}{125} = 8$

REF: 011312ia

3 ANS: 2

$5 \times 4 \times 2\frac{1}{2} = 50$

REF: 061530ia

4 ANS:

5,112. $(12 \times 30 \times 16) - (6 \times 12 \times 9) = 5112$

REF: 080932ia

5 ANS: 4

$V = \pi r^2 h = \pi \cdot 6^2 \cdot 15 \approx 1696.5$

REF: fall0712ia

6 ANS: 3

$V = \pi \cdot 3^2 \cdot 7 = 63\pi$

REF: 011505ia

7 ANS: 3

$V = \pi r^2 h = \pi \cdot 5^2 \cdot 2.3 \approx 180.6$

REF: 081105ia

8 ANS:

$V = \pi r^2 h = \pi \cdot 6.5^2 \cdot 24 = 1014\pi$

REF: 061332ia

9 ANS:

$V = \pi \cdot 2.5^2 \cdot 11 \approx 215.98$

REF: 081433ia

10 ANS:

Carol's, by 14.9. $V_M = 5 \times 3.5 \times 7 = 122.5$. $V_C = \pi \times 2.5^2 \times 7 \approx 137.4$. $137.4 - 122.5 = 14.9$

REF: 061237ia

11 ANS: 4

$V = \pi r^2 h$

$32\pi = \pi r^2(2)$

$16 = r^2$

$4 = r$

REF: 081224ia

12 ANS:

$\frac{38}{\pi}$, 2. $V = \pi r^2 h$. $\frac{36}{\left(\frac{38}{\pi}\right)} \approx 2.97$. Three cans will not fit. The maximum number is 2.

$342 = \pi\left(\frac{6}{2}\right)^2 h$

$\frac{342}{9\pi} = h$

$\frac{38}{\pi} = h$

REF: 010936ia