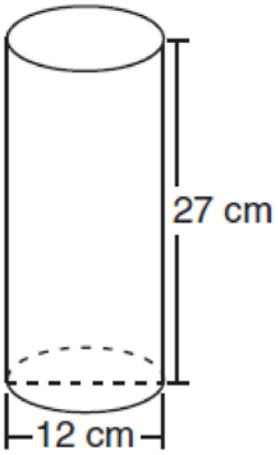
Name: _____

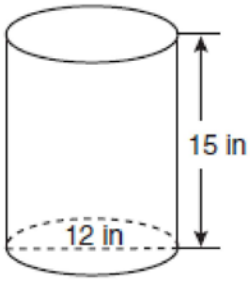
G.GMD.A.3: Volume 3

1 Which expression represents the volume, in cubic centimeters, of the cylinder represented in the diagram below?



1) 162π
2) 324π
3) 972π
4) $3,888\pi$

2 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

3 What is the volume, in cubic centimeters, of a cylinder that has a height of 15 cm and a diameter of 12 cm?

1) 180π
2) 540π
3) 675π
4) $2,160\pi$

4 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

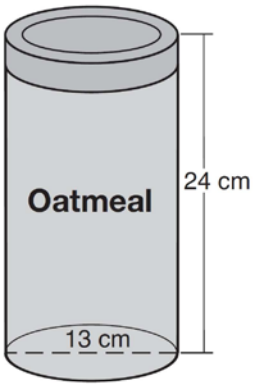
5 A cylinder has a circular base with a radius of 3 units and a height of 7 units. What is the volume of the cylinder in cubic units?
1) 2π
2) 42π
3) 63π
4) 147π

6 Tennis balls are sold in cylindrical cans with the balls stacked one on top of the other. A tennis ball has a diameter of 6.7 cm. To the *nearest cubic centimeter*, what is the minimum volume of the can that holds a stack of 4 tennis balls?
1) 236
2) 282
3) 564
4) 945

7 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

8 A right circular cylinder has a volume of 1,000 cubic inches and a height of 8 inches. What is the radius of the cylinder to the *nearest tenth of an inch*?
1) 6.3
2) 11.2
3) 19.8
4) 39.8

9 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.

10 A cylinder has a height of 7 cm and a base with a diameter of 10 cm. Determine the volume, in cubic centimeters, of the cylinder in terms of π.

11 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.

12 A barrel of fuel oil is a right circular cylinder where the inside measurements of the barrel are a diameter of 22.5 inches and a height of 33.5 inches. There are 231 cubic inches in a liquid gallon. Determine and state, to the *nearest tenth*, the gallons of fuel that are in a barrel of fuel oil.

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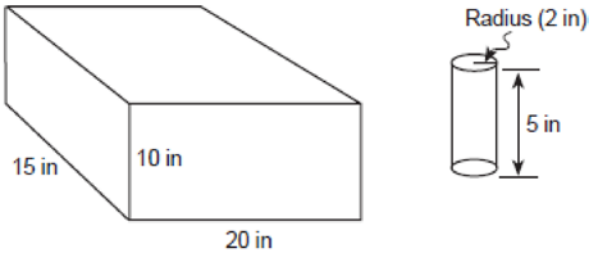
13 The volume of a cylinder is 12,566.4 cm^3. The height of the cylinder is 8 cm. Find the radius of the cylinder to the *nearest tenth of a centimeter*.

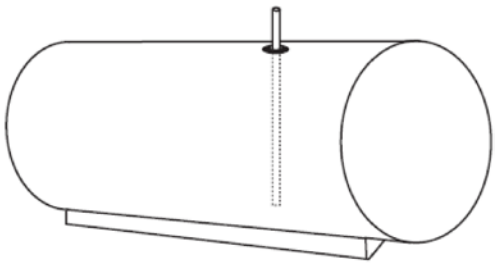
14 A soup can is in the shape of a cylinder. The can has a volume of 342 cm^3 and a diameter of 6 cm. Express the height of the can in terms of π. Determine the maximum number of soup cans that can be stacked on their base between two shelves if the distance between the shelves is exactly 36 cm. Explain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

15 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.

16 In the accompanying diagram, a rectangular container with the dimensions 10 inches by 15 inches by 20 inches is to be filled with water, using a cylindrical cup whose radius is 2 inches and whose height is 5 inches. What is the maximum number of full cups of water that can be placed into the container without the water overflowing the container?



17 A gas station has a cylindrical fueling tank that holds the gasoline for its pumps, as modeled below. The tank holds a maximum of 20,000 gallons of gasoline and has a length of 34.5 feet.



A metal pole is used to measure how much gas is in the tank. To the *nearest tenth of a foot*, how long does the pole need to be in order to reach the bottom of the tank and still extend one foot outside the tank? Justify your answer. [1 ft^3=7.48 gallons]

G.GMD.A.3: Volume 3
Answer Section

1 ANS: 3
$V = \pi r^2 h = \pi \cdot 6^2 \cdot 27 = 972\pi$

REF: 011027ge

2 ANS: 4
$V = \pi r^2 h = \pi \cdot 6^2 \cdot 15 \approx 1696.5$

REF: fall0712ia

3 ANS: 2
$V = \pi r^2 h = \pi \cdot 6^2 \cdot 15 = 540\pi$

REF: 011117ge

4 ANS: 3
$V = \pi r^2 h = \pi \cdot 5^2 \cdot 2.3 \approx 180.6$

REF: 081105ia

5 ANS: 3
$V = \pi \cdot 3^2 \cdot 7 = 63\pi$

REF: 011505ia

6 ANS: 4
$V = \pi\left(\frac{6.7}{2}\right)^2 (4 \cdot 6.7) \approx 945$

REF: 081620geo

7 ANS: 4
$V = \pi r^2 h$

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

$16 = r^2$

$4 = r$

REF: 081224ia

8 ANS: 1
$V = \pi r^2 h$

$1000 = \pi r^2 \cdot 8$

$r^2 = \frac{1000}{8\pi}$

$r \approx 6.3$

REF: 080926ge

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

REF: 061332ia

10 ANS:
$V = \pi r^2 h = \pi(5)^2 \cdot 7 = 175\pi$

REF: 081231ge

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

REF: 081433ia

12 ANS:
$\frac{\pi \cdot 11.25^2 \cdot 33.5}{231} \approx 57.7$

REF: 061632geo

13 ANS:
22.4. $V = \pi r^2 h$

$12566.4 = \pi r^2 \cdot 8$

$r^2 = \frac{12566.4}{8\pi}$

$r \approx 22.4$

REF: fall0833ge

14 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

15 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

16 ANS:

47. $\frac{10 \times 15 \times 20}{\pi \times 2^2 \times 5} \approx 47.7$. The question asks how many *full* cups of water can be placed into the container without the water overflowing, so do not round up to 48. The answer is 47.

REF: 010227a

17 ANS:

$20000\,\text{g}\left(\frac{1\,\text{ft}^3}{7.48\,\text{g}}\right) = 2673.8\,\text{ft}^3 \quad 2673.8 = \pi r^2(34.5) \quad 9.9 + 1 = 10.9$

$r \approx 4.967$

$d \approx 9.9$

REF: 061734geo