

A.G.2: Volume: 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 If the length of a side of a cube is $7x$, which expression represents the cube's volume?

- 1) $7x^3$
- 2) $49x^3$
- 3) $343x$
- 4) $343x^3$

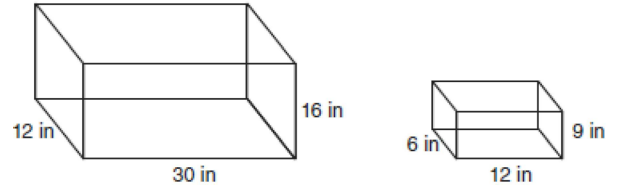
3 A block of wood is 5 inches long, 2 inches wide, and 3 inches high. What is the volume of this block of wood?

- 1) 10 in^3
- 2) 25 in^3
- 3) 30 in^3
- 4) 38 in^3

4 A cardboard box has length $x - 2$, width $x + 1$, and height $2x$.

- a Write an expression, in terms of x , to represent the volume of the box.
- b If $x = 8$ centimeters, what is the number of cubic centimeters in the volume of the box?

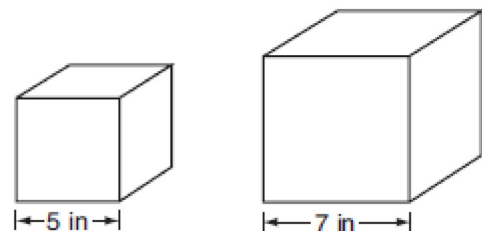
5 The diagram below represents Joe's two fish tanks.



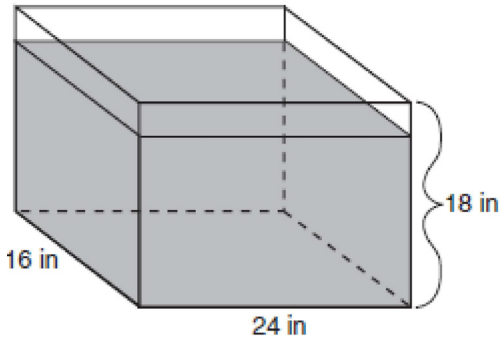
Joe's larger tank is completely filled with water. He takes water from it to completely fill the small tank. Determine how many cubic inches of water will remain in the larger tank.

6 Tina's preschool has a set of cardboard building blocks, each of which measures 9 inches by 9 inches by 4 inches. How many of these blocks will Tina need to build a wall 4 inches thick, 3 feet high, and 12 feet long?

7 Tracey has two empty cube-shaped containers with sides of 5 inches and 7 inches, as shown in the accompanying diagram. She fills the smaller container completely with water and then pours all the water from the smaller container into the larger container. How deep, to the *nearest tenth of an inch*, will the water be in the larger container?

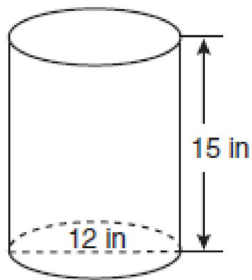


- 8 As shown in the accompanying diagram, the length, width, and height of Richard's fish tank are 24 inches, 16 inches, and 18 inches, respectively. Richard is filling his fish tank with water from a hose at the rate of 500 cubic inches per minute. How long will it take, to the *nearest minute*, to fill the tank to a depth of 15 inches?



(Not drawn to scale)

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

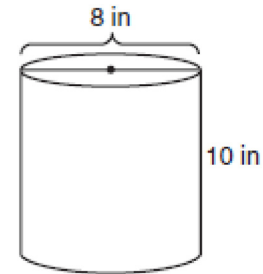


(Not drawn to scale)

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

- 10 A storage container in the shape of a right circular cylinder is shown in the accompanying diagram.



What is the volume of this container, to the *nearest hundredth*?

- 1) 56.55 in³
- 2) 125.66 in³
- 3) 251.33 in³
- 4) 502.65 in³

- 11 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

- 12 A soup can is in the shape of a cylinder. The can has a volume of 342 cm³ 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: 4

$$(7x)^3 = 343x^3$$

REF: 060830a

3 ANS: 3

$$5 \times 2 \times 3 = 30$$

REF: 010802a

4 ANS:

$$V = (x - 2)(x + 1)(2x), 864. \quad (8 - 2)(8 + 1)(2(8)) = 864$$

REF: 010123a

5 ANS:

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

REF: 080932ia

6 ANS:

64. The wall in common dimensions is 4 by 36 by 144 inches, with a volume of 20736 cubic inches. The volume of a block is 324 cubic inches. $\frac{4 \times 36 \times 144}{9 \times 9 \times 4} = 64$

REF: 060327a

7 ANS:

2.6. If Tracey fills the smaller container, it will contain $5^3 = 125$ cubic inches of water. $lwh = 125$

$$7 \cdot 7 \cdot h = 125$$

$$h \approx 2.6$$

REF: 060737a

8 ANS:

$$12. \quad \frac{24 \times 16 \times 15}{500} \approx 12$$

REF: 010537a

9 ANS: 4

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

REF: fall0712ia

10 ANS: 4

$$V = \pi r^2 h = \pi 4^2 \cdot 10 \approx 502.65$$

REF: 060530a

11 ANS: 3

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

REF: 081105ia

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