

NAME: _____

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

1. 010802a, P.I. A.G.2

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

- [A] 10 in^3 [B] 38 in^3
[C] 25 in^3 [D] 30 in^3

2. 060830a, P.I. A.G.2

If the length of a side of a cube is $7x$, which expression represents the cube's volume?

- [A] $49x^3$ [B] $343x^3$
[C] $7x^3$ [D] $343x$

3. 010123a, P.I. A.G.2

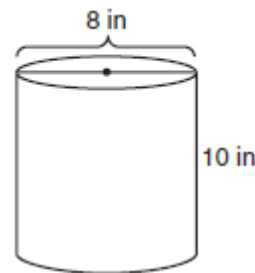
A cardboard box has length $x - 2$, width $x + 1$, and height $2x$.

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?

4. 060530a, P.I. A.G.2

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?

- [A] 125.66 in^3 [B] 56.55 in^3
[C] 251.33 in^3 [D] 502.65 in^3

5. 069927a, P.I. A.G.2

The dimensions of a brick, in inches, are 2 by 4 by 8. How many such bricks are needed to have a total volume of exactly 1 cubic foot?

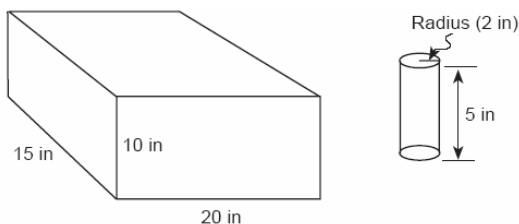
6. 060327a, P.I. A.G.2

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?

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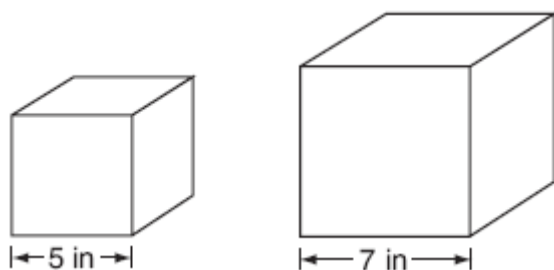
7. 010227a, P.I. A.G.2

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?



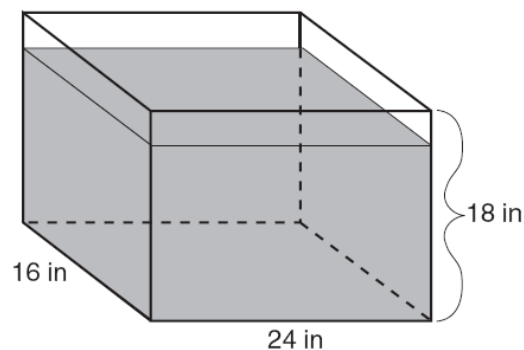
8. 060737a, P.I. A.G.2

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?



9. 010537a, P.I. A.G.2

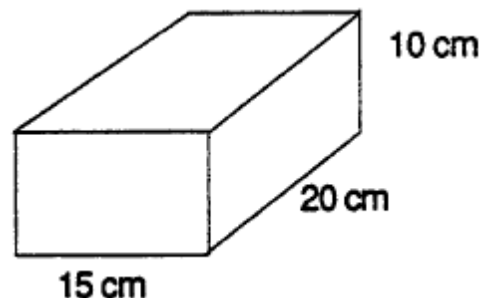
As shown in the accompanying diagram, the length, width, and height of Richard's fish tank are 24 inches, 16 inches, and 18 inches, respectively. Richard is filling his fish tank with water from a hose at the rate of 500 cubic inches per minute. How long will it take, to the *nearest minute*, to fill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



(Not drawn to scale)

10. spring9832a, P.I. A.G.2

Jed bought a generator that will run for 2 hours on a liter of gas. The gas tank on the generator is a rectangular prism with dimensions 20 cm by 15 cm by 10 cm as shown below.



If Jed fills the tank with gas, how long will the generator run? [Note: $1000 \text{ cm}^3 = 1 \text{ liter}$]

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[1] D _____

[2] B _____

a [1] Either $(x - 2)(x + 1)(2x) = V$ or the same expression without " $= V$ " is shown.

or [1] $2x^3 - 2x^2 - 4x$ or an equivalent expression is shown.

b [1] 864

or [1] The student substitutes appropriately into an incorrect part a equation.

[0] A zero response is completely incorrect, irrelevant, or incoherent or is a correct response that was obtained by an obviously

[3] incorrect procedure.

[4] D _____

[3] 27 and an appropriate method or explanation is shown, such as

$(\frac{1}{6})(\frac{1}{3})(\frac{2}{3}) = \frac{1}{27}$ of a cubic foot, thus 27

bricks needed or, in inches, $\frac{1728}{64} = 27$. A

labeled drawing is an acceptable explanation.

[2] An appropriate method for finding volume is shown, but one computational mistake is made.

[1] Correct conversion into feet is shown.

or [1] The volume of 64 cubic inches is found.

or [1] 27 and no explanation is given.

[0] A zero response is completely incorrect, irrelevant, or incoherent or is a correct response that was obtained by an obviously

[5] incorrect procedure.

[3] 64, and appropriate work is shown, such as calculating $\frac{(36 \times 144)}{(9 \times 9)}$ or drawing a

labeled diagram.

[2] Appropriate work is shown, but one computational error is made.

[1] Appropriate work is shown, but more than one computational error is made.

or [1] Appropriate work is shown, but one conceptual error is made.

or [1] 64, but no work is shown.

[0] A zero response is completely incorrect, irrelevant, or incoherent or is a correct response that was obtained by an obviously

[6] incorrect procedure.

[3] 47, and appropriate work is shown.

[2] Appropriate work is shown, but one computational or rounding error is made.

or [2] The correct numerical value of the volume of the cup (20π or its equivalent) and the volume of the tank (3,000) are shown, but the solution is not completed.

[1] The correct volume of only the cup or only the tub is shown.

or [1] 47, but no work is shown.

[0] A zero response is completely incorrect, irrelevant, or incoherent or is a correct response that was obtained by an obviously

[7] incorrect procedure.

[3] 2.6, and appropriate work is shown, such as $(5 \bullet 5 \bullet 5) = (7 \bullet 7)h$.

[2] Appropriate work is shown, but one computational or rounding error is made.

[1] Appropriate work is shown, but two or more computational or rounding errors are made.

or [1] Appropriate work is shown, but one conceptual error is made, such as using an incorrect formula.

or [1] The volume of both of the cubes is found correctly, but no further correct work is shown.

or [1] 2.6, but no work is shown.

[0] A zero response is completely incorrect, irrelevant, or incoherent or is a correct response that was obtained by an obviously

[8] incorrect procedure.

[3] 12, and appropriate work is shown, such as calculating volume = $5,760 \text{ in}^3$ and dividing by 500 in^3 .

[2] Appropriate work is shown, but one computational or rounding error is made.

or [2] The volume is found incorrectly by multiplying $24 \times 16 \times 18$, but it is divided by 500 and rounded appropriately, resulting in an answer of 14.

[1] Appropriate work is shown, but two or more computational or rounding errors are made.

or [1] Appropriate work is shown, but one conceptual error is made.

or [1] The volume of 5,760 is found correctly, but no further correct work is shown.

or [1] 12, but no work is shown.

[0] A zero response is completely incorrect, irrelevant, or incoherent or is a correct response that was obtained by an obviously

[9] incorrect procedure.

[4] Correct answer of 6 hours with work shown which might include correct volume of 3000 cm^3 and converting to 3 liters.

[3] Correct answer with no work shown.

or [3] Correct work shown but hours not indicated.

or [3] Correct method used but one mistake in calculations or conversions.

[2] Finding the tank's capacity of 3 liters.

[10] [1] Finds only the volume of the tank.