

Finding the Volume of Rectangular Prisms

Grade 6 math · Worksheet Answer Key · Standards: 6.G.A.2

Each solution shows the cube count or the formula, the substitution and a check. If your volume differs, look first for a unit mismatch or for edges that were added instead of multiplied.

Standards: 6.G.A.2 · **Level:** Grade 6

Problem 1 Counting unit cubes

One layer holds $4 \times 3 = 12$ cubes. There are 2 layers, so $12 \times 2 = 24$.

24 cubic units

Problem 2 Volume of a box

$$V = 9 \times 4 \times 5 = 36 \times 5 = 180.$$

180 cubic inches

Problem 3 Volume of a cube

$$V = 8 \times 8 \times 8 = 512.$$

512 cubic centimeters

Problem 4 Volume from the base area

$$V = Bh = 24 \times 7 = 168.$$

168 cubic feet

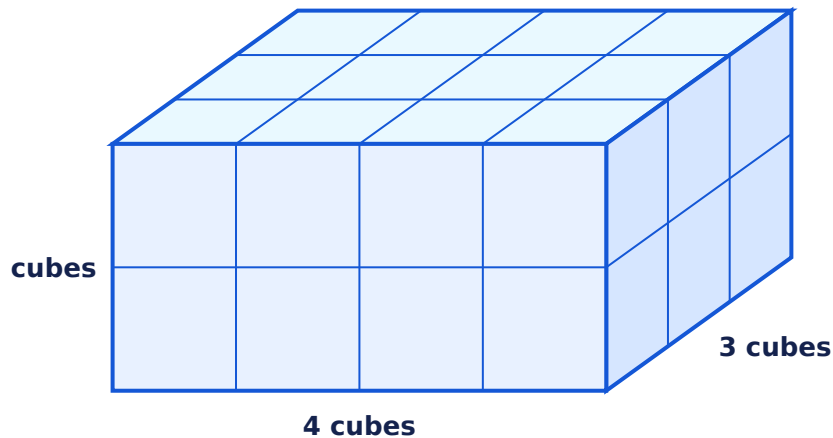
Problem 5 A small metric box

$$V = 10 \times 6 \times 4 = 60 \times 4 = 240.$$

240 cubic centimeters

Problem 6 Packing with half-foot cubes

- a. The prism holds $2 \text{ ft} \div \frac{1}{2} \text{ ft} = 4$ cubes along the length, 3 along the width and 2 along the height: $4 \times 3 \times 2 = 24$ cubes.
- b. One cube: $\frac{1}{2} \times \frac{1}{2} \times \frac{1}{2} = \frac{1}{8}$ cubic foot.
- c. $24 \times \frac{1}{8} = 3$. Check: $2 \times 1\frac{1}{2} \times 1 = 3$.



$$4 \times 3 \times 2 = 24 \text{ cubes of } \frac{1}{8} \text{ cubic foot.}$$

(a) 24 cubes; (b) $\frac{1}{8} \text{ ft}^3$; (c) 3 cubic feet

Problem 7 A prism with fractional edges

$$V = \frac{5}{2} \times 2 \times \frac{3}{2} = 5 \times \frac{3}{2} = \frac{15}{2} = 7\frac{1}{2}.$$

$7\frac{1}{2}$ cubic inches

Problem 8 Missing height

$$180 = 9 \times 5 \times h = 45h, \text{ so } h = 180 \div 45 = 4. \text{ Check: } 9 \times 5 \times 4 = 180.$$

4 feet

Problem 9 Volume with decimals

$$V = Bh = 3.5 \times 4 = 14.$$

14 cubic meters

Problem 10 Fish tank

$$V = 24 \times 12 \times 15 = 288 \times 15 = 4,320.$$

4,320 cubic inches

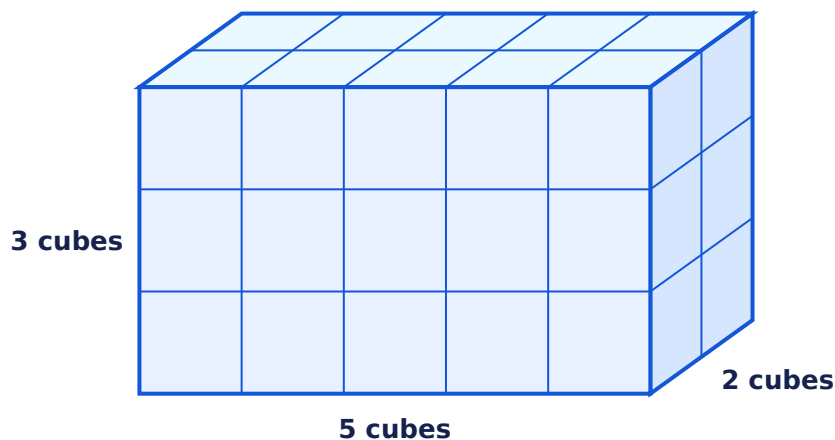
Problem 11 Cube with a fraction edge

$$V = \frac{3}{4} \times \frac{3}{4} \times \frac{3}{4} = \frac{27}{64}.$$

$\frac{27}{64}$ cubic inch

Problem 12 Packing with quarter-foot cubes

- a. Along the length $\frac{5}{4} \div \frac{1}{4} = 5$ cubes, along the width $\frac{1}{2} \div \frac{1}{4} = 2$ cubes, along the height $\frac{3}{4} \div \frac{1}{4} = 3$ cubes: $5 \times 2 \times 3 = 30$ cubes.
- b. One cube is $\frac{1}{4} \times \frac{1}{4} \times \frac{1}{4} = \frac{1}{64}$ cubic foot, so the volume is $30 \times \frac{1}{64} = \frac{30}{64} = \frac{15}{32}$. Check: $\frac{5}{4} \times \frac{1}{2} \times \frac{3}{4} = \frac{15}{32}$.



$$5 \times 2 \times 3 = 30 \text{ cubes of } \frac{1}{64} \text{ cubic foot.}$$

(a) 30 cubes; (b) $\frac{15}{32}$ cubic foot

Problem 13 Missing width

$$96 = 8 \times w \times 3 = 24w, \text{ so } w = 96 \div 24 = 4.$$

4 centimeters

Problem 14 Comparing two boxes

Box A: $14 \times 6 \times 5 = 84 \times 5 = 420$. Box B: $10 \times 8 \times 5.5 = 80 \times 5.5 = 440$. The difference is $440 - 420 = 20$.

Box B is greater by 20 cubic inches

Problem 15 Sand for a sandbox

- a. $8 \times 5.5 \times 0.75 = 44 \times 0.75 = 33$ cubic feet.
- b. $33 \div 2.5 = 13.2$, so 13 bags are not enough: 14 bags.
- c. $14 \times 4.50 = 63$.

(a) 33 ft³; (b) 14 bags; (c) \$63

Problem 16 Water in an aquarium

- a. $20 \times 10 \times 12 = 2,400$.
- b. The water depth is $\frac{3}{4} \times 12 = 9$ inches, so $20 \times 10 \times 9 = 1,800$.
- c. $2,400 - 1,800 = 600$.

(a) 2,400 in³; (b) 1,800 in³; (c) 600 in³

Problem 17 Concrete slab

- a. $12 \times 9 \times \frac{1}{3} = 108 \times \frac{1}{3} = 36$ cubic feet.
- b. $36 \times 6.25 = 225$.

(a) 36 ft³; (b) \$225

Problem 18 Filling a gift box

- a. $7.5 \div 1.5 = 5$, $4.5 \div 1.5 = 3$ and $3 \div 1.5 = 2$, so $5 \times 3 \times 2 = 30$ cubes.
- b. $7.5 \times 4.5 \times 3 = 33.75 \times 3 = 101.25$ cubic inches.
- c. One cube is $1.5 \times 1.5 \times 1.5 = 3.375$, and $101.25 \div 3.375 = 30$, which matches part (a).

(a) 30 cubes; (b) 101.25 in³; (c) 3.375 in³ per cube

Problem 19 Filling a pool

- a. $20 \times 12 \times 5 = 1,200$ cubic feet.
- b. The depth is $5 - 0.5 = 4.5$ feet, so $20 \times 12 \times 4.5 = 240 \times 4.5 = 1,080$.
- c. $1,080 \div 30 = 36$.

(a) 1,200 ft³; (b) 1,080 ft³; (c) 36 minutes

Problem 20 Changing the height

$270 = 7.5 \times 4 \times h = 30h$, so $h = 9$. The second prism has height 4.5 inches: $7.5 \times 4 \times 4.5 = 135$. Half the height gives half the volume: $270 \div 2 = 135$.

Height 9 inches; second volume 135 cubic inches