Word Problems with Volume

Grade 5 Math • Section 9.5

Name: _____	Date: _____	Score: _____ / 10

Quick Review and Helpful Hints

- **Volume formula:** $V = l \times w \times h$.
- **Finding a missing dimension:** If V and two dimensions are known, divide to find the third: $h = V \div (l \times w)$.
- Volume is always given in **cubic** units. Read the problem carefully to identify what is given and what is asked.

Example: A box has a volume of 480 in^3. It is 12 in long and 8 in wide. What is the height?

$V = l \times w \times h$, so $h = V \div (l \times w) = 480 \div (12 \times 8) = 480 \div 96 = 5$ in.

Answer: 5 inches

Practice Problems

Solve each word problem. Show your work.

1. A toy box is 3 ft long, 2 ft wide, and 2 ft tall. What is its volume?

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2. A rectangular aquarium holds $1{,}200$ cm^3 of water. It is 15 cm long and 10 cm wide. How deep is the water?

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3. A cube has a volume of 125 cm^3. What is the length of one side? (Hint: $5 \times 5 \times 5 = ?$)

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4. A moving box is 18 in long, 12 in wide, and 15 in tall. How many cubic inches of space does it have?

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5. A swimming pool is 10 m long, 5 m wide, and 2 m deep. How many cubic meters of water can it hold?

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6. A storage container has a base area of 36 ft^2 and a height of 5 ft. What is the volume?

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7. A crate has a volume of 864 in^3. Its length is 12 in and height is 9 in. What is the width?

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8. Two boxes have the same base (6 cm by 4 cm). Box A is 5 cm tall and Box B is 8 cm tall. How much more volume does Box B have?

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Word Problems

9. A sandbox is 6 feet long, 4 feet wide, and 1 foot deep. Sand costs $\$2$ per cubic foot. How much will it cost to fill the sandbox?

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10. A warehouse has a room that is 40 ft long, 25 ft wide, and 12 ft tall. Boxes occupy 60% of the room's volume. What volume of the room is empty?

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Answer Keys

1. $12\ \text{ft}^3$
2. $8\ \text{cm}$
3. $5\ \text{cm}$
4. $3{,}240\ \text{in}^3$
5. $100\ \text{m}^3$
6. $180\ \text{ft}^3$
7. $8\ \text{in}$
8. $72\ \text{cm}^3$
9. $\$48$
10. $4{,}800\ \text{ft}^3$

Step-by-Step Explanations

1. Start with the main idea. For word problems with volume, $3 \times 2 \times 2 = 12$ cubic feet. Volume counts cubic units, so the unit on the answer should be cubic units.

2. Keep the work tidy. For word problems with volume, depth is $1{,}200 \div (15 \times 10) = 8$ cm. For rectangular prisms, multiply length, width, and height.

3. Look at what the numbers mean. For word problems with volume, $5 \times 5 \times 5 = 125$, so the side length is 5 cm. For composite figures, find each prism's volume first and then add.

4. Use the setup first. For word problems with volume, $18 \times 12 \times 15 = 3{,}240$ cubic inches. Volume counts cubic units, so the unit on the answer should be cubic units.

5. Check the size of the answer. For word problems with volume, $10 \times 5 \times 2 = 100$ cubic meters. For rectangular prisms, multiply length, width, and height.

6. Match the operation to the words. For word problems with volume, $V = Bh = 36 \times 5 = 180$ cubic feet. For composite figures, find each prism's volume first and then add.

7. Write the important values first. For word problems with volume, width is $864 \div (12 \times 9) = 8$ inches. Volume counts cubic units, so the unit on the answer should be cubic units.

8. Follow the pattern carefully. For word problems with volume, the shared base is $6 \times 4 = 24$; extra height is $8 - 5 = 3$, so extra volume is $24 \times 3 = 72$. For rectangular prisms, multiply length, width, and height.

9. Start with the main idea. For word problems with volume, volume is $6 \times 4 \times 1 = 24$ cubic feet; cost is $24 \times 2 = 48$. For composite figures, find each prism's volume first and then add.

10. Keep the work tidy. For word problems with volume, room volume is $40 \times 25 \times 12 = 12{,}000$ cubic feet. Empty space is 40% of that, or $4{,}800$ cubic feet. Volume counts cubic units, so the unit on the answer should be cubic units.

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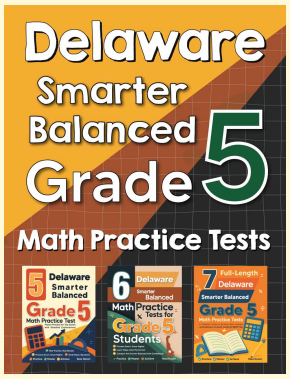

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