Solving Real-World Volume Problems

Solving Real-World Volume Problems: Find, Fix, and Work Backward

Name _____ **Date** _____ **Score** _____ / 8

QUICK REVIEW

Use inside dimensions for capacity and the filled height for contents. A base area uses square units; multiplying it by a height gives cubic units. To recover a height, divide the known volume by its base area.

Worked example

A mold holds 132 cm^3 and its inside floor covers 22 cm^2. Find the inside depth.

1. Each centimeter of depth holds 22 cm^3. Divide: $132 \div 22 = 6$ cm.
2. Check: $22 \times 6 = 132$ cm^3.
Answer: 6 cm.

Practice Problems

Show your thinking.

1. A tank is 8 cm tall with a 12 cm by 3 cm base. It contains 144 cm^3 of water. A student says the water is 8 cm deep. Find the actual depth and explain.

2. A trough holds 150 cm^3. Its inside length is 10 cm and its height is 3 cm. Recover the inside width.

3. A worker adds $5 + 2 + 3$ for the volume of a 5 m by 2 m by 3 m storage bay and reports 10 m^3. Correct the method and value.

4. Two equal compartments together hold 168 cm^3. The inside floor of each is 7 cm by 3 cm. Recover the depth of each.

5. A 10 cm by 8 cm by 6 cm box holds 2 cm cubes. A student divides its volume, 480 cm^3, by 2 and predicts 240 cubes. Fix the cube count.

6. A bin has a 9 cm by 4 cm floor. Its marked fill line holds 180 cm^3 and is 1 cm below the top. Find the fill depth and total inside height.

7. A 6 cm by 3 cm front face is labeled 18 cm^2. A student calls that the volume. The box extends 5 cm behind the face. Give the correct area and volume.

8. A crate keeps a 6 cm by 4 cm inside base. Its capacity changes from 144 to 216 cm^3. Recover both heights and decide whether the height doubled.

Answer Key

1. 4 cm; the tank is only partly filled.
2. 5 cm.
3. 30 m^3; multiply the three dimensions.
4. 4 cm per compartment.
5. 60 cubes; each occupies 8 cm^3.
6. Fill depth 5 cm; total height 6 cm.
7. Face area 18 cm^2; volume 90 cm^3.
8. 6 cm then 9 cm; no, the height increased by 3 cm.

Step-by-Step Solutions

Follow each calculation, then check your own work.

Problem 1

1. Water covers $12 \times 3 = 36$ cm^2 of base. Its depth is $144 \div 36 = 4$ cm.
2. At 8 cm it would hold $36 \times 8 = 288$ cm^3, not the given amount.

Problem 2

1. The length-height face covers $10 \times 3 = 30$ cm^2.
2. Width is $150 \div 30 = 5$ cm. Check $10 \times 5 \times 3 = 150$ cm^3.

Problem 3

1. Adding the edges gives 10 m of length, not a volume.
2. The floor is $5 \times 2 = 10$ m^2. Use the height: $10 \times 3 = 30$ m^3.

Problem 4

1. One compartment holds $168 \div 2 = 84$ cm^3.
2. Its floor is $7 \times 3 = 21$ cm^2. Depth is $84 \div 21 = 4$ cm.

Problem 5

1. 2 cm is an edge. Each cube occupies $2 \times 2 \times 2 = 8$ cm^3.
2. Cube count: $480 \div 8 = 60$. Check with $5 \times 4 \times 3 = 60$ positions.

Problem 6

1. The floor covers $9 \times 4 = 36$ cm^2.
2. The fill depth is $180 \div 36 = 5$ cm. Add the top clearance: $5 + 1 = 6$ cm.

Problem 7

1. The face covers $6 \times 3 = 18$ cm^2, a two-dimensional measure.
2. Multiply by the 5 cm depth: $18 \times 5 = 90$ cm^3.

Problem 8

1. The base is $6 \times 4 = 24$ cm^2.
2. Heights: $144 \div 24 = 6$ cm and $216 \div 24 = 9$ cm.
3. The increase is $9 - 6 = 3$ cm. Double the original would be 12 cm.

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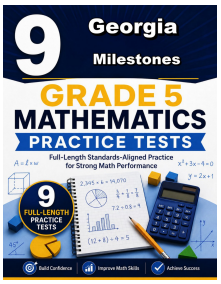

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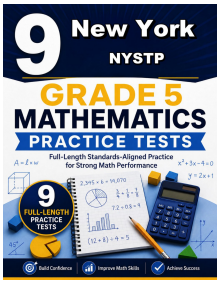

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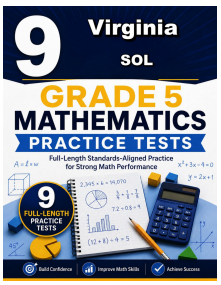

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