Solving Real-World Volume Problems

Solving Real-World Volume Problems: Models and Computation

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 soap mold is 6 cm long and 2 cm wide inside. It is filled to a depth of 4 cm. Find the soap volume.

1. The base area is $6 \times 2 = 12$ cm^2.

2. Four centimeters of depth give $12 \times 4 = 48$ cm^3.

Answer: 48 cm^3.

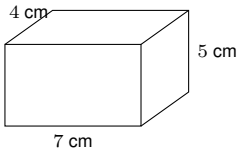
Practice Problems

Show your thinking.

1. A tank has a 9 cm by 5 cm inside base. It is 8 cm tall, but the water is only 3 cm deep. Find the water volume.

2. A storage bay has a rectangular floor of area 12 m^2 and a clear height of 2 m. Find its storage volume.

3. Use the labeled inside measurements of the pictured bin. Find its floor area and capacity.



4. A display case is 8 cm long, 3 cm wide, and 2 cm high inside. Find the amount of space it holds and choose cm, square cm, or cubic cm.

5. A 12 cm by 8 cm by 6 cm box is filled with 2 cm cubes in complete rows and layers. Find the cube count and the volume they occupy.

6. Two tanks have the same base area. Use the table to find their water volumes and how much more water the deeper tank holds.

Tank	Base (cm^2)	Depth (cm)
A	18	3
B	18	5

7. An organizer has 3 equal compartments. Each is 4 cm by 3 cm by 2 cm inside. Find the combined capacity.

8. An ice tray is shaped like a rectangular prism with base area 21 cm^2 and capacity 84 cm^3. Is its depth 3 cm or 4 cm? Verify the choice.

Answer Key

1. 135 cm^3.
2. 24 m^3.
3. Floor 28 cm^2; capacity 140 cm^3.
4. 48 cm^3; cubic centimeters.
5. 72 cubes; 576 cm^3.
6. A: 54 cm^3; B: 90 cm^3; B holds 36 cm^3 more.
7. 72 cm^3.
8. 4 cm.

Step-by-Step Solutions

Follow each calculation, then check your own work.

Problem 1

1. The water covers $9 \times 5 = 45$ cm^2 of base.
2. Use the water depth, not the tank height: $45 \times 3 = 135$ cm^3.

Problem 2

1. One meter of height over the 12 m^2 floor occupies 12 m^3.
2. Two meters of height give $12 \times 2 = 24$ m^3.

Problem 3

1. Floor area: $7 \times 4 = 28$ cm^2.
2. Multiply by the height: $28 \times 5 = 140$ cm^3.

Problem 4

1. The floor covers $8 \times 3 = 24$ cm^2.
2. With 2 cm of height, $24 \times 2 = 48$ cm^3. Three lengths give cubic units.

Problem 5

1. Edge counts: $12 \div 2 = 6$, $8 \div 2 = 4$, and $6 \div 2 = 3$.
2. There are $6 \times 4 \times 3 = 72$ cubes.
3. Each cube occupies $2 \times 2 \times 2 = 8$ cm^3, so $72 \times 8 = 576$ cm^3.

Problem 6

1. A holds $18 \times 3 = 54$ cm^3. B holds $18 \times 5 = 90$ cm^3.
2. The difference is $90 - 54 = 36$ cm^3.

Problem 7

1. One compartment holds $4 \times 3 \times 2 = 24$ cm^3.
2. The 3 compartments hold $3 \times 24 = 72$ cm^3.

Problem 8

1. Depth is volume divided by base area: $84 \div 21 = 4$ cm.
2. Check: $21 \times 4 = 84$ cm^3.

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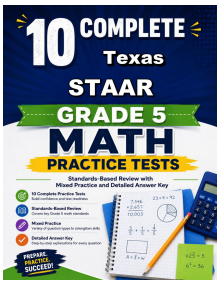

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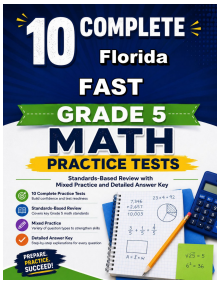

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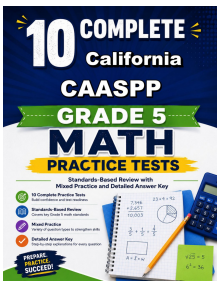

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