Volume of Composite Figures

Volume of Composite Figures: Models and Computation

Name _____ **Date** _____ **Score** _____ / 6

QUICK REVIEW

Split a solid into rectangular prisms that do not overlap, then add their volumes. Or subtract only the missing part from a full outer box. Use cubic units for volume.

Worked example

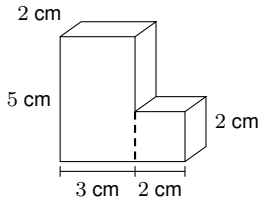
A 5 cm by 2 cm by 3 cm block is cut into 2 cm and 3 cm wide pieces. Both pieces keep the original depth and height. Show that the two pieces together have the original volume.

1. The pieces have volumes $2 \times 2 \times 3 = 12$ cm^3 and $3 \times 2 \times 3 = 18$ cm^3.
2. The sum is $12 + 18 = 30$ cm^3, the same as $5 \times 2 \times 3 = 30$ cm^3 for the original block.
Answer: Both methods give 30 cm^3.

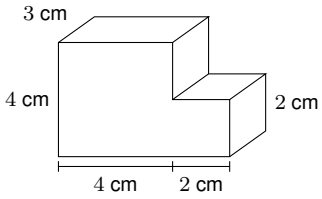
Practice Problems

Show your thinking.

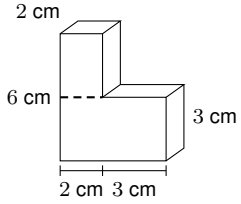
1. Use the shown vertical divider to find the total volume of the solid.



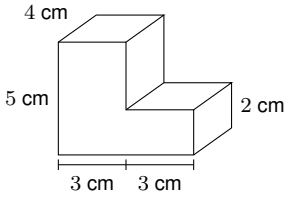
2. Draw a line on the front face from the inside step corner straight down to the bottom edge. Find the left prism volume, the right prism volume, and the total.



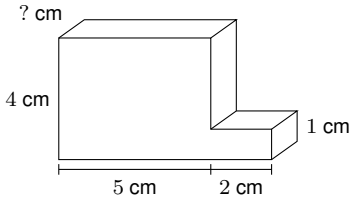
3. Use the shown horizontal divider. Find the volume below it, the volume above it, and the total.



4. Find the volume of the solid by subtracting the missing upper-right corner from the full outer box.



5. The solid occupies 44 cm^3. Find its shared front-to-back depth.



6. A stepped solid joins a 2 cm by 3 cm by 5 cm prism to a 4 cm by 3 cm by 3 cm prism without overlap. Compare it with a 60 cm^3 block. Which has more volume, and by how much?

Answer Key

1. 38 cm^3.
2. Left 48 cm^3; right 12 cm^3; total 60 cm^3.
3. Below 30 cm^3; above 12 cm^3; total 42 cm^3.
4. 84 cm^3.
5. 2 cm.
6. The stepped solid has 6 cm^3 more volume.

Step-by-Step Solutions

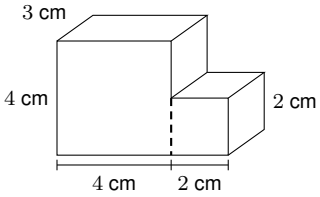
Follow each calculation, then check your own work.

Problem 1

1. Left prism: $3 \times 2 \times 5 = 30$ cm^3.
2. Right prism: $2 \times 2 \times 2 = 8$ cm^3.
3. The prisms do not overlap. Add: $30 + 8 = 38$ cm^3.

Problem 2

1. Mark the inside corner of the step. Use a straightedge to join it vertically to the bottom edge. The cut goes straight back through the shared depth, forming two rectangular prisms.



2. Left prism: $4 \times 3 \times 4 = 48$ cm^3.
3. Right prism: $2 \times 3 \times 2 = 12$ cm^3.
4. The prisms do not overlap. Add: $48 + 12 = 60$ cm^3.

Problem 3

1. The lower prism spans both widths: $2 + 3 = 5$ cm. Its volume is $5 \times 2 \times 3 = 30$ cm^3.
2. The upper prism is $6 - 3 = 3$ cm high, so its volume is $2 \times 2 \times 3 = 12$ cm^3.
3. Add the two volumes: $30 + 12 = 42$ cm^3.

Problem 4

1. The full box is $3 + 3 = 6$ cm wide, so its volume is $6 \times 4 \times 5 = 120$ cm^3.
2. The missing corner is $5 - 2 = 3$ cm high. Its volume is $3 \times 4 \times 3 = 36$ cm^3.
3. Subtract just the missing corner: $120 - 36 = 84$ cm^3.

Problem 5

1. The front face has area $5 \times 4 + 2 \times 1 = 22$ cm^2.
2. Volume is front area times depth. Divide: $44 \div 22 = 2$ cm.

Problem 6

1. The prism volumes are $2 \times 3 \times 5 = 30$ cm^3 and $4 \times 3 \times 3 = 36$ cm^3.
2. The total is $30 + 36 = 66$ cm^3. The difference is $66 - 60 = 6$ cm^3.

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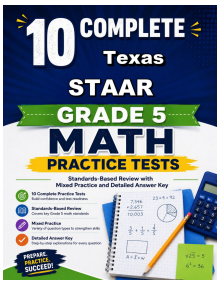

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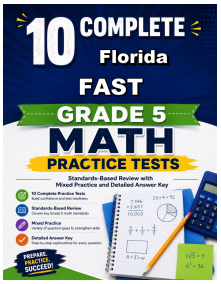

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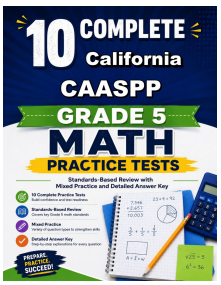

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