Additive Volume (Composite Figures)

Grade 5 Math • Section 9.4

Name: _____	Date: _____	Score: _____ / 10

Quick Review and Helpful Hints

Additive volume: A composite solid can be split into two or more rectangular prisms. Find the volume of each part, then add them together.

Look for ways to cut the shape into non-overlapping rectangular boxes.

Make sure the parts don't overlap and that you include all parts of the figure.

Example: An L-shaped room is made of two rectangular prisms. Prism A: $6 \times 4 \times 3$. Prism B: $5 \times 4 \times 3$. Find the total volume.

$V_A = 6 \times 4 \times 3 = 72$. $V_B = 5 \times 4 \times 3 = 60$. Total $= 72 + 60 = 132$ cubic units.

Answer: 132 cubic units

Practice Problems

Find the total volume of each composite figure.

1. Prism A: $4 \times 3 \times 2$. Prism B: $5 \times 3 \times 2$. Total volume $=$ _____

2. Prism A: $10 \times 5 \times 3$. Prism B: $6 \times 5 \times 3$. Total volume $=$ _____

3. Prism A: $8 \times 4 \times 2$. Prism B: $8 \times 3 \times 2$. Total volume $=$ _____

4. Prism A: $7 \times 7 \times 4$. Prism B: $3 \times 7 \times 4$. Total volume $=$ _____

5. Prism A: $12 \times 6 \times 5$. Prism B: $8 \times 6 \times 3$. Total volume $=$ _____

6. Prism A: $5 \times 5 \times 5$. Prism B: $5 \times 5 \times 5$. Total volume $=$ _____

7. A step-shaped figure: bottom $10 \times 4 \times 2$, top $6 \times 4 \times 2$. Total volume $=$ _____

8. A T-shaped figure: base $8 \times 3 \times 2$, top $4 \times 3 \times 3$. Total volume $=$ _____

Word Problems

9. A building has a ground floor that is 20 m long, 10 m wide, and 4 m tall. A smaller second floor on top is 12 m long, 10 m wide, and 3 m tall. What is the total volume?

_____

10. A swimming pool is shaped like an L. One section is 8 m $\times$ 4 m $\times$ 2 m and the other section is 6 m $\times$ 4 m $\times$ 2 m. What is the total volume of water the pool can hold?

_____

Answer Keys

1. $\boxed{54}$
2. $\boxed{240}$
3. $\boxed{112}$
4. $\boxed{280}$
5. $\boxed{504}$
6. $\boxed{250}$
7. $\boxed{128}$
8. $\boxed{84}$
9. $\boxed{1{,}160\ \text{m}^3}$
10. $\boxed{112\ \text{m}^3}$

Step-by-Step Explanations

1. Start with the main idea. For additive volume (composite figures), add volumes: $4 \times 3 \times 2 = 24$ and $5 \times 3 \times 2 = 30$, total 54. Volume counts cubic units, so the unit on the answer should be cubic units.

2. Keep the work tidy. For additive volume (composite figures), $10 \times 5 \times 3 = 150$ and $6 \times 5 \times 3 = 90$, total 240. For rectangular prisms, multiply length, width, and height.

3. Look at what the numbers mean. For additive volume (composite figures), $8 \times 4 \times 2 = 64$ and $8 \times 3 \times 2 = 48$, so the total volume is $64 + 48 = 112$. For composite figures, find each prism's volume first and then add.

4. Use the setup first. For additive volume (composite figures), $7 \times 7 \times 4 = 196$ and $3 \times 7 \times 4 = 84$, total 280. Volume counts cubic units, so the unit on the answer should be cubic units.

5. Check the size of the answer. For additive volume (composite figures), $12 \times 6 \times 5 = 360$ and $8 \times 6 \times 3 = 144$, total 504. For rectangular prisms, multiply length, width, and height.

6. Match the operation to the words. For additive volume (composite figures), each prism is $5^3 = 125$; $125 + 125 = 250$. For composite figures, find each prism's volume first and then add.

7. Write the important values first. For additive volume (composite figures), bottom volume is $10 \times 4 \times 2 = 80$ and top volume is $6 \times 4 \times 2 = 48$; total 128. Volume counts cubic units, so the unit on the answer should be cubic units.

8. Follow the pattern carefully. For additive volume (composite figures), base volume is $8 \times 3 \times 2 = 48$ and top volume is $4 \times 3 \times 3 = 36$; total 84. For rectangular prisms, multiply length, width, and height.

9. Start with the main idea. For additive volume (composite figures), ground floor volume is $20 \times 10 \times 4 = 800$ and second floor volume is $12 \times 10 \times 3 = 360$; total $1{,}160$. For composite figures, find each prism's volume first and then add.

10. Keep the work tidy. For additive volume (composite figures), add the two sections: $8 \times 4 \times 2 = 64$ and $6 \times 4 \times 2 = 48$, total 112. Volume counts cubic units, so the unit on the answer should be cubic units.

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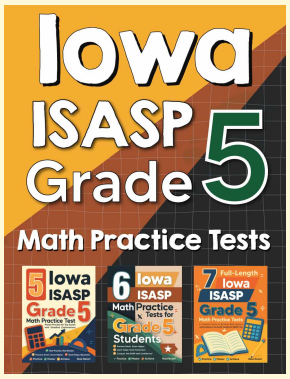

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