Base Times Height

Sort volume calculations for right rectangular prisms.

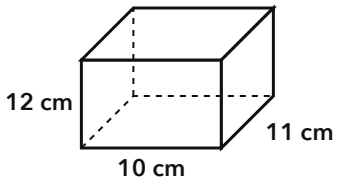
5.GSR.8.4 "Discover and explain how the volume of a right rectangular prism can be found by multiplying the area of the base times the height to solve authentic, mathematical problems."

NAME _____ DATE _____

FINDS VOLUME

This calculation multiplies the area of a base by the height. The answer is written in cubic units.

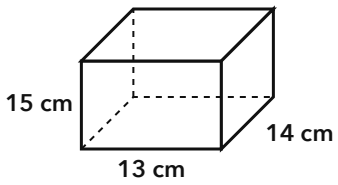
$(10 \times 11) \times 12 = 1{,}320 \text{ cm}^3$



DOES NOT FIND VOLUME

This calculation does not multiply a base area by the height, or it uses the wrong unit. A volume answer must be in cubic units.

$(13 \times 14) + 15 = 197 \text{ cm}^3$



1 SORT

8 items

For each figure, circle WORKS or NOT WORK, then choose two figures and explain how you knew.

1.

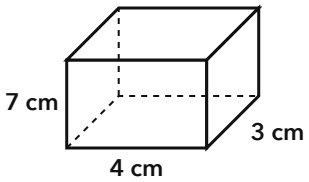


Figure 1: $(4 \times 3) \times 7 = 84 \text{ cm}^3$

WORKS NOT WORK

2.

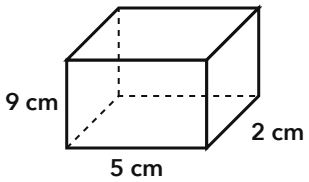


Figure 2: $5 + 2 + 9 = 16 \text{ cm}^3$

WORKS NOT WORK

3.

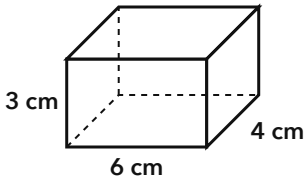


Figure 3: $(6 \times 4) + 3 = 27\ cm^3$

WORKS **NOT WORK**

4.

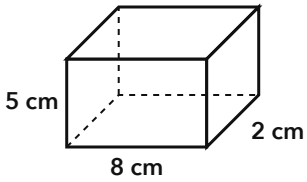


Figure 4: $(8 \times 2) \times 5 = 80\ cm^3$

WORKS **NOT WORK**

5.

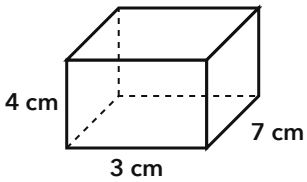


Figure 5: $3 \times 7 \times 4 = 84\ cm^3$

WORKS **NOT WORK**

6.

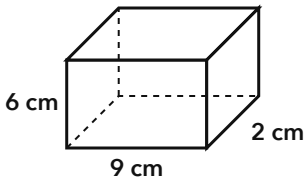


Figure 6: $(9 + 2) \times 6 = 66\ cm^3$

WORKS **NOT WORK**

7.

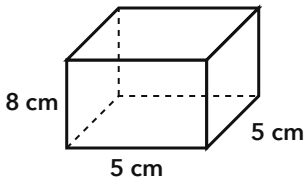


Figure 7: $(5 \times 5) \times 8 = 200\ cm^2$

WORKS **NOT WORK**

8.

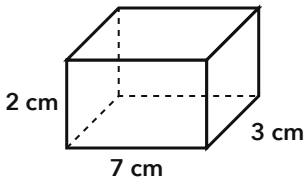


Figure 8: $(7 \times 3) \times 2 = 42\ cm^3$

WORKS **NOT WORK**

2 PROVE IT

Explain your thinking

Pick two items from Part 1. For each one, tell how you knew where it belonged.

ITEM # _____ **HOW I KNEW** _____

ITEM # _____ **HOW I KNEW** _____

3 MAKE YOUR OWN

One of each

Write one new WORKS example and one new NOT WORK example for a right rectangular prism.

WORKS _____

NOT WORK _____

CHALLENGE

A storage box has a base area of 48 cm² and a height of 9 cm. Find its volume and show one equation.

ANSWER KEY

Base Times Height

GRADE 5 · 5.GSR.8.4

PART 1 · SORT

#	ITEM	CATEGORY	WHY
1	Figure 1: (4 × 3) × 7 = 84 cm³ (prism)	**WORKS**	The base area is 4 × 3 = 12 cm², and 12 × 7 = 84 cm³.
2	Figure 2: 5 + 2 + 9 = 16 cm³ (prism)	**NOT WORK**	Adding the dimensions does not find base area times height.
3	Figure 3: (6 × 4) + 3 = 27 cm³ (prism)	**NOT WORK**	It adds the height instead of multiplying the base area by the height.
4	Figure 4: (8 × 2) × 5 = 80 cm³ (prism)	**WORKS**	The base area is 16 cm², and 16 × 5 = 80 cm³.
5	Figure 5: 3 × 7 × 4 = 84 cm³ (prism)	**WORKS**	This multiplies the base dimensions, 3 and 7, then multiplies by height 4.
6	Figure 6: (9 + 2) × 6 = 66 cm³ (prism)	**NOT WORK**	The base dimensions must be multiplied, not added.
7	Figure 7: (5 × 5) × 8 = 200 cm² (prism)	**NOT WORK**	The multiplication gives volume, but the unit should be cm³, not cm².
8	Figure 8: (7 × 3) × 2 = 42 cm³ (prism)	**WORKS**	The base area is 21 cm², and 21 × 2 = 42 cm³.

PART 2 · PROVE IT

Accept any explanation that names the deciding feature from the rule box for the chosen item.

PART 3 · MAKE YOUR OWN (SAMPLE ANSWERS)

- **WORKS**: A prism has a 16 cm by 17 cm base and a height of 18 cm. (16 × 17) × 18 = 4,896 cm³.
- **NOT WORK**: A prism has a 19 cm by 20 cm base and a height of 21 cm. (19 + 20) × 21 = 819 cm³.

Challenge: 48 cm² × 9 cm = 432 cm³

Accept equivalent correct volume equations, including multiplying all three dimensions when the base dimensions are clear. In Part 2, look for a statement about multiplying base area by height and using cubic units.