LESSON MAKER PRO

Missing Edge Mission

Use volume and surface area to find unknown dimensions.

HIGH SCHOOL · GDA.GM.A.17.b

GDA.GM.A.17.b "Apply geometric concepts to find missing dimensions to solve surface area or volume problems."

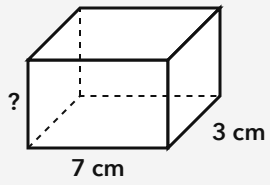
NAME _____ DATE _____

WORK BACKWARD

For a rectangular prism, volume is V = lwh. To find a missing edge from the volume, divide by the product of the other two edges. For a closed rectangular prism, surface area is SA = 2(lw + lh + wh); substitute the known edges, then solve for the missing one.

WORKED EXAMPLE

The prism has a volume of 231 cm^3. Find the missing height shown.

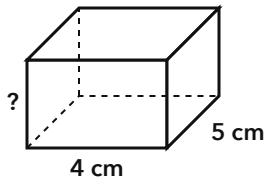


1. V = lwh, so 231 = 7 × 3 × h.
2. Multiply the known edges: 231 = 21h.
3. Divide: h = 231/21 = 11.

Answer: 11 cm

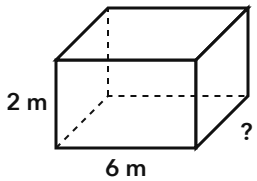
PRACTICE 6 problems

1 The prism's volume is 120 cm^3. Find the missing height shown.



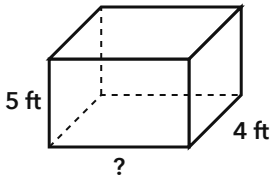
ANSWER _____

2 The prism's volume is 108 m^3. Find the missing width shown.



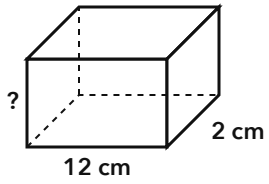
ANSWER _____

3 The prism's volume is 160 ft^3. Find the missing length shown.



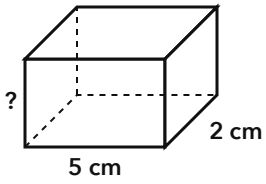
ANSWER _____

4 The prism's volume is 336 cm^3. Find the missing height shown.



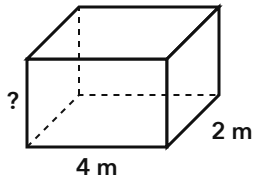
ANSWER _____

5 The closed prism's surface area is 76 cm^2. Find the missing height shown.



ANSWER _____

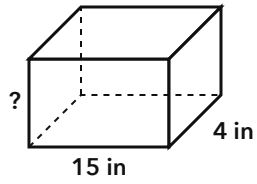
6 The closed prism's surface area is 88 m^2. Find the missing height shown.



ANSWER _____

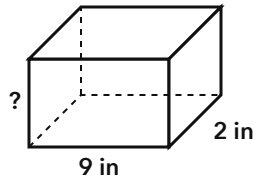
APPLY IT Show your work

1 You are choosing a shipping box for a pair of sneakers. A box with the dimensions shown has a volume of 360 in^3. What is its height?



ANSWER _____

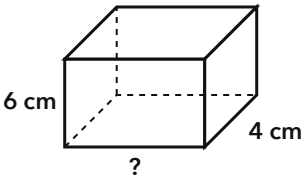
2 You want to cover all six outside faces of a closed gaming PC case with vinyl. The case has the dimensions shown, and its surface area is 124 in^2. What is its height?



ANSWER _____

CHALLENGE One step up

The closed prism has a volume of 240 cm^3. Find the missing length shown, then find its surface area.



WORK SPACE AND ANSWER

ANSWER KEY

Missing Edge Mission

PART 1 · PRACTICE

#	PROBLEM	ANSWER
1	The prism's volume is 120 cm^3. Find the missing height shown.	**6 cm**
2	The prism's volume is 108 m^3. Find the missing width shown.	**9 m**
3	The prism's volume is 160 ft^3. Find the missing length shown.	**8 ft**
4	The prism's volume is 336 cm^3. Find the missing height shown.	**14 cm**
5	The closed prism's surface area is 76 cm^2. Find the missing height shown.	**4 cm**
6	The closed prism's surface area is 88 m^2. Find the missing height shown.	**6 m**

PART 2 · APPLY IT

1. **6 in** Divide the volume by the product of the known edges: 360/(15 × 4) = 6 in.
2. **4 in** Use 124 = 2(9 × 2 + 9h + 2h). Then 62 = 18 + 11h, so h = 4 in.

CHALLENGE

Length: 10 cm; surface area: 248 cm^2.

Accept equivalent equations that correctly use the dimensions shown. For the challenge, the length is 240/(4 × 6) = 10 cm, and the surface area is 2(10 × 4 + 10 × 6 + 4 × 6) = 248 cm^2.