

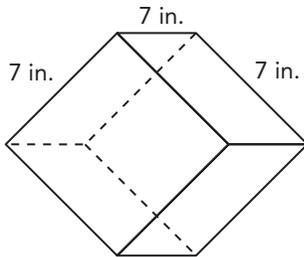
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Lesson 12.3 Volume of Prisms

Find the volume of each rectangular prism.

1.

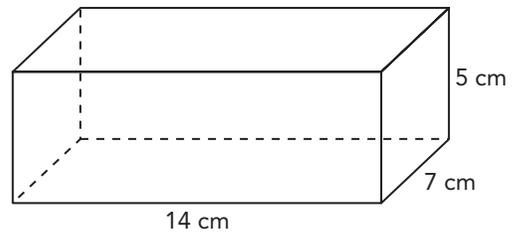


Volume

$$= \underline{\quad} \times \underline{\quad} \times \underline{\quad}$$

$$= \underline{\quad} \text{ in.}^3$$

2.



Volume

$$= \underline{\quad} \times \underline{\quad} \times \underline{\quad}$$

$$= \underline{\quad} \text{ cm}^3$$

Example

A rectangular prism measures $5\frac{1}{2}$ inches by 4.2 inches by $3\frac{3}{4}$ inches.
Find the volume of the prism.

$$\text{Length} = \underline{5\frac{1}{2}} \text{ in.}$$

$$\text{Width} = \underline{4.2} \text{ in.}$$

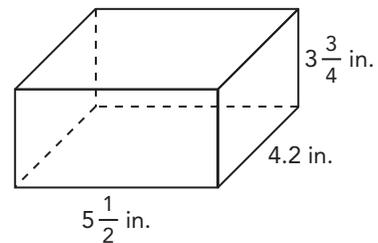
$$\text{Height} = \underline{3\frac{3}{4}} \text{ in.}$$

$$\text{Volume} = \ell wh$$

$$= \underline{5\frac{1}{2}} \times \underline{4.2} \times \underline{3\frac{3}{4}}$$

$$= \underline{86\frac{5}{8}} \text{ in.}^3$$

The volume of the prism is $\underline{86\frac{5}{8}}$ cubic inches.



The **volume** of any rectangular prism of length ℓ , width w , and height h is given by $V = \ell wh$

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3. A rectangular prism measures 8 inches by $6\frac{1}{2}$ inches by 12 inches. What is the volume of the rectangular prism?

Length = _____ in.

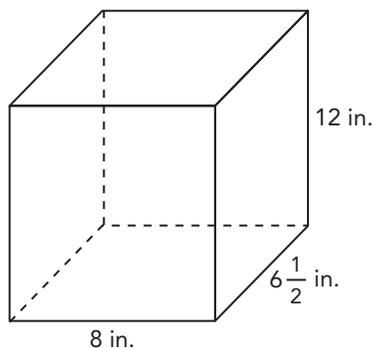
Width = _____ in.

Height = _____ in.

Volume = lwh

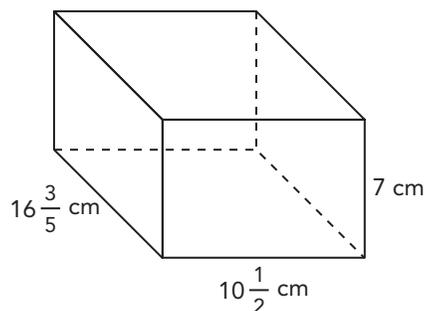
= _____ \times _____ \times _____

= _____ in.³

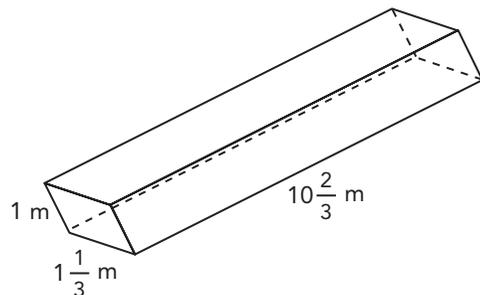


The volume of the rectangular prism is _____ cubic inches.

4.



5.



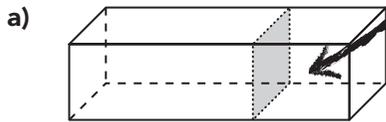
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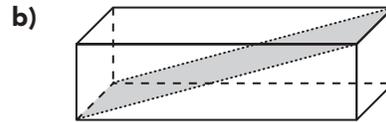
Tell whether slices parallel to each given slice will form uniform cross sections. If not, explain why not.

Example

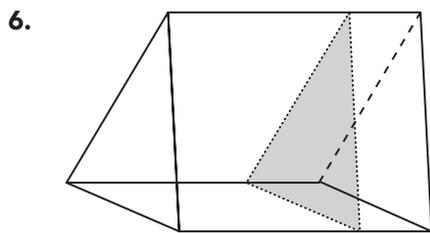
A **cross section** is any slice through a solid figure. A uniform cross section of a prism means the cross section is parallel to the base.



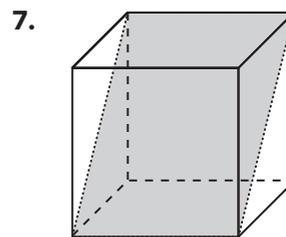
The slice _____ *forms* _____ a uniform cross section.



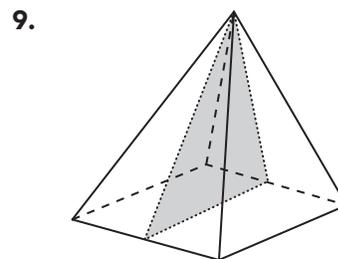
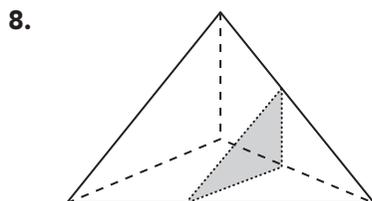
The slice _____ *does not form* _____ a uniform cross section. *The rectangle has different dimensions with other cuts.*



The slice _____ a uniform cross section.

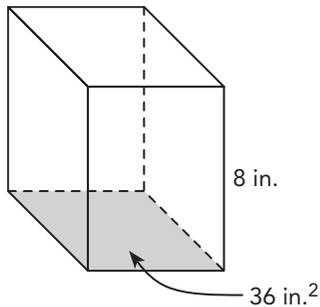


The slice _____ a uniform cross section.



Find the volume of each prism.*Example*

The prism shown has bases that are squares. The area of a base is 36 square inches. The height of the prism is 8 inches. Find the volume of the prism.



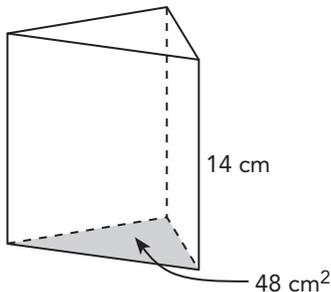
$$\text{Volume} = \text{area of base} \cdot \text{height}$$

$$= \underline{36} \cdot \underline{8}$$

$$= \underline{288} \text{ in.}^3$$

The volume of the prism is 288 cubic inches.

- 10.** The prism shown has bases that are triangles. The area of a base is 48 square centimeters. The height of the prism is 14 centimeters. Find the volume of the prism.



$$\text{Volume} = \text{area of base} \cdot \text{height}$$

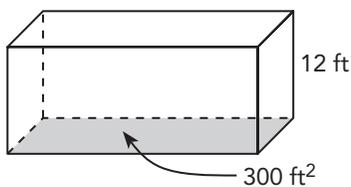
$$= \underline{\hspace{2cm}} \cdot \underline{\hspace{2cm}}$$

$$= \underline{\hspace{2cm}} \text{ cm}^3$$

The volume of the prism is

 cubic centimeters.

- 11.** The prism shown has bases that are rectangles. The area of a base is 300 square feet. The height of the prism is 12 feet. Find the volume of the prism.



6. Area = 9×10
= 90 cm^2
7. There are 6 square faces.
Area of each square face
= 20×20
= 400 ft^2
Surface area
= number of square faces
× area of each square face
= 6×400
= $2,400 \text{ ft}^2$
The surface area of the cube is $2,400$ square feet.
8. 1,350 square meters
9. 3,456 square centimeters
10. There are 2 rectangles, A, 2 rectangles, B, and 2 rectangles, C.
Area of two rectangles, A
= $2 \times 3 \times 2$
= 12 m^2
Area of rectangles, B and C
= $(2 + 3 + 2 + 3) \times 6$
= 60 m^2
Surface area
= total area of rectangles, A, B and C
= $12 + 60$
= 72 m^2
The surface area of the prism is 72 square meters.
11. 262 square inches
12. 2,854 square centimeters
13. There are 3 rectangles and 2 triangles.
Area of two triangles.
= $2 \times \frac{1}{2} \times 3 \times 2.6$
= 7.8 cm^2
Area of three rectangles
= $(3 + 3 + 3) \times 5$
= 45 cm^2
Surface area
= total area of triangles and rectangles
= $7.8 + 45$
= 52.8 cm^2
The surface area of the prism
is 52.8 square centimeters.
14. 1,360.5 square meters
15. 408 square inches
16. Area of square base
= 20×20
= 400 ft^2

Area of four triangles

$$= 4 \times \frac{1}{2} \times 20 \times 12$$

$$= 480 \text{ ft}^2$$

Surface area

= total area of square base and triangles

$$= 400 + 480$$

$$= 880 \text{ ft}^2$$

The surface area of the pyramid is 880 square feet.

17. 224.4 square centimeters
18. 135.6 square feet
19. 424.45 square centimeters

Lesson 12.3

1. Volume

$$= 7 \times 7 \times 7$$

$$= 343 \text{ in.}^3$$

2. Volume

$$= 14 \times 7 \times 5$$

$$= 490 \text{ cm}^3$$

3. Length = 8 in.

$$\text{Width} = 6\frac{1}{2} \text{ in.}$$

$$\text{Height} = 12 \text{ in.}$$

Volume = ℓwh

$$= 8 \times 6\frac{1}{2} \times 12$$

$$= 624 \text{ in.}^3$$

The volume of the rectangular prism
is 624 cubic inches.

4. $1,220\frac{1}{10} \text{ cm}^3$

5. $14\frac{2}{9} \text{ m}^3$

6. forms

7. does not form; The rectangle has different dimensions with other cuts.

8. The slice does not form a uniform cross section. The triangle has different dimensions with other cuts.

9. The slice does not form a uniform cross section. The triangle has different dimensions with other cuts.

10. Volume

= area of base · height

$$= 48 \cdot 14$$

$$= 672 \text{ cm}^3$$

The volume of the prism is 672 cubic centimeters.

11. 3,600 cubic feet