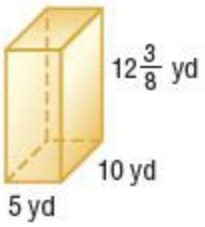
**10-1 Volume of Rectangular Prisms**

**Find the volume of the prism.**

2. 


*SOLUTION:*

$V = lwh$

$V = 5 \cdot 10 \cdot 12\frac{3}{8}$

$V = \frac{5}{1} \cdot \frac{10}{1} \cdot \frac{99}{8}$

$V = 618\frac{3}{4}$

The volume is 618.75 cubic yards.

*ANSWER:*

$618.75\,\text{yd}^3$

4. A fishing tackle box is 13 inches long, 6 inches wide, and $2\frac{1}{2}$ inches high. What is the volume of the tackle box?

*SOLUTION:*

$V = lwh$

$V = 13 \cdot 6 \cdot 2\frac{1}{2}$

$V = \frac{13}{1} \cdot \frac{6}{1} \cdot \frac{5}{2}$

$V = 195$

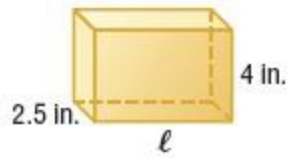
The volume of the tackle box is 195 cubic inches.

*ANSWER:*

$195\ \text{in}^3$

## 10-1 Volume of Rectangular Prisms

**Find the missing dimension of the prism.**

6. 


$V = 60 \text{ in}^3$

*SOLUTION:*

$$V = lwh$$
$$60 = l \bullet 2.5 \bullet 4$$
$$60 = 10l$$
$$\frac{60}{10} = \frac{10l}{10}$$
$$6 = l$$

The length of the prism is 6 inches.

*ANSWER:*

6 in.

8. **Be Precise** In Japan, farmers have created watermelons in the shape of rectangular prisms. Find the volume of a prism-shaped watermelon in cubic inches if its length is 10 inches, its width is $\frac{2}{3}$ foot, and its height is 9 inches.

*SOLUTION:*

Rewrite $\frac{2}{3}$ foot as 8 inches.

$$V = lwh$$
$$V = 10 \bullet 8 \bullet 9$$
$$V = 720$$

The volume of a cube-shaped watermelon is 720 cubic inches.

*ANSWER:*

$720 \text{ in}^3$

10. **Identify Structure** Refer to the graphic novel frame below for Exercises a–c.


**a.** Pilar chose the box on the left. If it is 8 inches long, 8 inches wide, and 8 inches tall, what is the volume of Pilar's box?
**b.** Amanda chose the box on the right. If it is 8 inches long, 6 inches wide, and 10 inches tall, what is the volume of Amanda's box?
**c.** Who received more popcorn, Pilar or Amanda? How much more?

*SOLUTION:*

**a.** The popcorn box on the left has a volume of $8 \times 8 \times 8$, or 512 cubic inches.
**b.** The volume of popcorn box on the right has a volume of $8 \times 6 \times 10$, or 480 cubic inches.
**c.** Pilar's box has a greater volume. Pilar received 512 – 480, or 32 cubic inches more popcorn.

*ANSWER:*

**a.** 512 $in^3$
**b.** 480 $in^3$
**c.** Pilar; 32 $in^3$

12. **Justify Conclusions** Which has the greater volume: a prism with a length of 5 inches, a width of 4 inches, and a height of 10 inches, or a prism with a length of 10 inches, a width of 5 inches, and a height of 4 inches? Justify your selection.

*SOLUTION:*

Volume of the First Prism:

$V = lwh$

$V = 5 \bullet 4 \bullet 10$

$V = 200$

The volume of the first prism is 200 cubic inches.

Volume of the Second Prism:

$V = lwh$

$V = 10 \bullet 5 \bullet 4$

$V = 200$

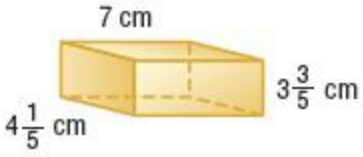
The volume of the second prism is 200 cubic inches.

Both prisms have the same volume of 200 cubic inches.

*ANSWER:*

They both have the same volume. Volume of the first prism: 5 × 4 × 10 or $200 \text{ in}^3$. Volume of the second prism: 10 × 5 × 4 or $200 \text{ in}^3$.

**Find the volume of the prism.**

14. 


*SOLUTION:*

$V = lwh$

$V = 7 \cdot 4\frac{1}{5} \cdot 3\frac{3}{5}$

$V = \frac{7}{1} \cdot \frac{21}{5} \cdot \frac{18}{5}$

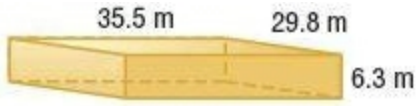
$V = 105.84$

The volume is 105.84 cubic centimeters.

*ANSWER:*

105.84 $\text{cm}^3$

## 10-1 Volume of Rectangular Prisms

16. 


*SOLUTION:*

$V = lwh$

$V = 35.5 \bullet 29.8 \bullet 6.3$

$V = 6,664.77$

The volume is 6,664.77 cubic meters.

*ANSWER:*

$6,664.77 \text{ m}^3$

18. What is the width of a rectangular prism with a length of 13 feet, volume of 11,232 cubic feet, and height of 36 feet?

*SOLUTION:*

$$V = lwh$$
$$11,232 = 13 \bullet w \bullet 36$$
$$11,232 = 468w$$
$$\frac{11,232}{468} = \frac{468w}{468}$$
$$24 = w$$

The width of the prism is 24 feet.

*ANSWER:*

24 ft

20. **Use Math Tools** Use the table.

| Inside Dimensions of Moving Trucks | | | |
|---|---|---|---|
| **Truck** | **Length (ft)** | **Width (ft)** | **Height (ft)** |
| Van | 10 | $6\frac{1}{2}$ | 6 |
| Small Truck | $11\frac{1}{13}$ | $7\frac{5}{12}$ | $6\frac{3}{4}$ |
| 2-Bedroom Moving Truck | $14\frac{1}{2}$ | $7\frac{7}{12}$ | $7\frac{1}{6}$ |
| 3-Bedroom Moving Truck | $20\frac{5}{6}$ | $7\frac{1}{2}$ | $8\frac{1}{12}$ |
| Mega Moving Truck | $22\frac{1}{4}$ | $7\frac{7}{12}$ | $8\frac{5}{12}$ |

**a.** What is the approximate volume of the small truck?

**b.** The Davis family is moving, and they estimate that they will need a truck with about 1,250 cubic feet. Which truck would be best for them to rent?

**c.** About how many cubic feet greater is the volume of the Mega Moving Truck than the 2-bedroom moving truck?

*SOLUTION:*

**a**. Round the length to 11 feet, the width to 7.5 feet, and the height to 7 feet.

$V = lwh$

$V = 11 \bullet 7.5 \bullet 7$

$V = 577.5$

The volume of the small truck is about 577.5 cubic feet.

**b.** Find the approximate volume of each moving truck.

2-Bedroom Moving Truck:

$V = lwh$

$V = 14.5 \bullet 7.5 \bullet 7$

$V = 761.25 \text{ ft}^3$

3-Bedroom Moving Truck:

$V = lwh$

$V = 21 \bullet 7.5 \bullet 8$

$V = 1,260 \text{ ft}^3$

Mega Moving Truck:

$V = lwh$

$V = 22 \bullet 7.5 \bullet 8.5$

$V = 1,402.5 \text{ ft}^3$

The volume of the 3-bedroom moving truck is about 1,260 cubic feet. The Davis family should rent this truck since they need a truck with about 1,250 cubic feet.

**c.** The volume of the Mega Moving Truck is about 1,402.5 cubic feet. The volume of the 2-bedroom moving truck is about 761.25 cubic feet. The volume of the Mega Moving Truck is about 1,402.5 – 761.25 or 641.25 cubic feet greater.

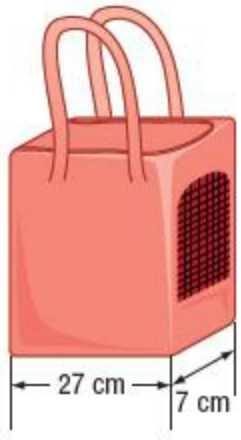
*ANSWER:*

**a.** Sample answer: $11 \times 7.5 \times 7 = 577.5 \text{ ft}^3$

**b.** 3-bedroom moving truck

**c.** Sample answer: Mega Moving Truck: $22 \times 7.5 \times 8.5 = 1,402.5 \text{ ft}^3$; 2-Bedroom Moving Truck: $14.5 \times 7.5 \times 7 = 761.25 \text{ ft}^3$; $1,402.5 - 761.25 = 641.25 \text{ ft}^3$

22. A pet carrier company is creating a new size carrier. It has a width of 27 centimeters, a length of 7 centimeters, and a volume of 6,426 cubic centimeters.




Select values to complete the formula below to find the height, $h$, of the carrier.

| |
|---|
| 7 |
| 27 |
| 6,426 |
| $h$ |

[ ] = [ ] × [ ] × [ ]

What is the height of the pet carrier?

*SOLUTION:*

$$V = lwh$$
$$6,426 = 7 \bullet 27 \bullet h$$
$$6,426 = 189h$$
$$\frac{6,426}{189} = \frac{189h}{189}$$
$$34 = h$$

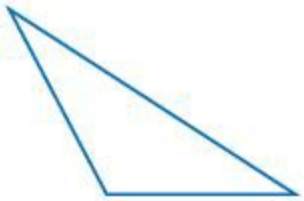
The height of the pet carrier is 34 centimeters.

*ANSWER:*

6,426 = 27 × 7 × h

34 cm

**Classify the triangle by the measure of the angles.**

24. 

*SOLUTION:*

There is one obtuse angle. It is an obtuse triangle.

*ANSWER:*

obtuse triangle

26. Draw the next figure in the pattern below.

*SOLUTION:*

The pattern begins with two equilateral triangles and then a right scalene triangle. To continue the pattern, after two equilateral triangles, the next figure will be a right scalene triangle.

*ANSWER:*