

# Volume of Rectangular Prisms

Name: \_\_\_\_\_

Date: \_\_\_\_\_

Score: \_\_\_\_\_ / 24

## Q Quick Review

**Volume** is the amount of space inside a solid figure — how much it can hold. A **rectangular prism** is a box shape with a length, a width, and a height. To find its volume, multiply all three:  $V = l \times w \times h$ . You can also think of it as the area of the bottom layer times how many layers tall it is. Volume is measured in **cubic units**, like cubic inches ( $\text{in}^3$ ) or cubic centimeters ( $\text{cm}^3$ ), because you are filling space in three directions. The order you multiply in does not matter — you will get the same answer.

◇ **Example:** Find the volume of a rectangular prism with a length of 8 cm, a width of 5 cm, and a height of 3 cm.  
 ⇒ Use the formula  $V = l \times w \times h$ . Start by multiplying the length and width:  $8 \times 5 = 40$  — that is the area of the bottom of the box. Now multiply by the height to stack up the layers:  $40 \times 3 = 120$ . Because we measured in centimeters, the volume is in cubic centimeters.

**Answer:** 120  $\text{cm}^3$

## PRACTICE

Find the volume of each rectangular prism. Use cubic units where given.

- |                                  |       |                                      |       |
|----------------------------------|-------|--------------------------------------|-------|
| 1. Prism: $l = 2, w = 3, h = 4$  | _____ | 11. Prism: $l = 12, w = 3, h = 4$    | _____ |
| 2. Prism: $l = 5, w = 2, h = 3$  | _____ | 12. Prism: $l = 10, w = 10, h = 2$   | _____ |
| 3. Prism: $l = 4, w = 4, h = 4$  | _____ | 13. Prism: $l = 7, w = 6, h = 5$     | _____ |
| 4. Prism: $l = 6, w = 3, h = 2$  | _____ | 14. Prism: $l = 15, w = 2, h = 4$    | _____ |
| 5. Prism: $l = 7, w = 5, h = 2$  | _____ | 15. Prism: $l = 8, w = 8, h = 8$     | _____ |
| 6. Prism: $l = 8, w = 3, h = 3$  | _____ | 16. Prism: $l = 2.5, w = 4, h = 6$   | _____ |
| 7. Prism: $l = 10, w = 2, h = 5$ | _____ | 17. Prism: $l = 3.5, w = 2, h = 4$   | _____ |
| 8. Prism: $l = 6, w = 6, h = 3$  | _____ | 18. Prism: $l = 20, w = 5, h = 3$    | _____ |
| 9. Prism: $l = 9, w = 4, h = 2$  | _____ | 19. Prism: $l = 1.5, w = 2.5, h = 4$ | _____ |
| 10. Prism: $l = 5, w = 5, h = 5$ | _____ | 20. Prism: $l = 11, w = 3, h = 3$    | _____ |

## ◆ Word Problems

21. An aquarium is shaped like a rectangular prism. It is 24 inches long, 12 inches wide, and 16 inches tall. What is the volume of the aquarium? \_\_\_\_\_
22. A toy box measures 30 cm long, 20 cm wide, and 15 cm tall. How many cubic centimeters of space is inside the box? \_\_\_\_\_
23. A lunchbox is 8 inches long, 6 inches wide, and 4 inches tall. What is its volume? \_\_\_\_\_
24. A cereal box is 10 cm wide, 6 cm deep, and 30 cm tall. If the box is only half full of cereal, how many cubic centimeters of cereal are inside? \_\_\_\_\_



## Answer Keys

- |                                      |                                                                  |
|--------------------------------------|------------------------------------------------------------------|
| 1. <input type="text" value="24"/>   | 13. <input type="text" value="210"/>                             |
| 2. <input type="text" value="30"/>   | 14. <input type="text" value="120"/>                             |
| 3. <input type="text" value="64"/>   | 15. <input type="text" value="512"/>                             |
| 4. <input type="text" value="36"/>   | 16. <input type="text" value="60"/>                              |
| 5. <input type="text" value="70"/>   | 17. <input type="text" value="28"/>                              |
| 6. <input type="text" value="72"/>   | 18. <input type="text" value="300"/>                             |
| 7. <input type="text" value="100"/>  | 19. <input type="text" value="15"/>                              |
| 8. <input type="text" value="108"/>  | 20. <input type="text" value="99"/>                              |
| 9. <input type="text" value="72"/>   | 21. <input type="text" value="4608 in&lt;sup&gt;3&lt;/sup&gt;"/> |
| 10. <input type="text" value="125"/> | 22. <input type="text" value="9000 cm&lt;sup&gt;3&lt;/sup&gt;"/> |
| 11. <input type="text" value="144"/> | 23. <input type="text" value="192 in&lt;sup&gt;3&lt;/sup&gt;"/>  |
| 12. <input type="text" value="200"/> | 24. <input type="text" value="900 cm&lt;sup&gt;3&lt;/sup&gt;"/>  |

### Step-by-Step Explanations

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| <p>1. Multiply all three: <math>2 \times 3 \times 4 = 24</math>.</p> <p>2. Multiply <math>5 \times 2 = 10</math>, then <math>10 \times 3 = 30</math>.</p> <p>3. Multiply <math>4 \times 4 = 16</math>, then <math>16 \times 4 = 64</math>.</p> <p>4. Multiply <math>6 \times 3 = 18</math>, then <math>18 \times 2 = 36</math>.</p> <p>5. Multiply <math>7 \times 5 = 35</math>, then <math>35 \times 2 = 70</math>.</p> <p>6. Multiply <math>8 \times 3 = 24</math>, then <math>24 \times 3 = 72</math>.</p> <p>7. Multiply <math>10 \times 2 = 20</math>, then <math>20 \times 5 = 100</math>.</p> <p>8. Multiply <math>6 \times 6 = 36</math>, then <math>36 \times 3 = 108</math>.</p> <p>9. Multiply <math>9 \times 4 = 36</math>, then <math>36 \times 2 = 72</math>.</p> <p>10. Multiply <math>5 \times 5 = 25</math>, then <math>25 \times 5 = 125</math>.</p> <p>11. Multiply <math>12 \times 3 = 36</math>, then <math>36 \times 4 = 144</math>.</p> <p>12. Multiply <math>10 \times 10 = 100</math>, then <math>100 \times 2 = 200</math>.</p> <p>13. Multiply <math>7 \times 6 = 42</math>, then <math>42 \times 5 = 210</math>.</p> | <p>14. Multiply <math>15 \times 2 = 30</math>, then <math>30 \times 4 = 120</math>.</p> <p>15. Multiply <math>8 \times 8 = 64</math>, then <math>64 \times 8 = 512</math>.</p> <p>16. Multiply <math>2.5 \times 4 = 10</math>, then <math>10 \times 6 = 60</math>.</p> <p>17. Multiply <math>3.5 \times 2 = 7</math>, then <math>7 \times 4 = 28</math>.</p> <p>18. Multiply <math>20 \times 5 = 100</math>, then <math>100 \times 3 = 300</math>.</p> <p>19. Multiply <math>1.5 \times 2.5 = 3.75</math>, then <math>3.75 \times 4 = 15</math>.</p> <p>20. Multiply <math>11 \times 3 = 33</math>, then <math>33 \times 3 = 99</math>.</p> <p>21. Multiply length, width, and height: <math>24 \times 12 = 288</math>, then <math>288 \times 16 = 4608</math> cubic inches.</p> <p>22. Multiply <math>30 \times 20 = 600</math>, then <math>600 \times 15 = 9000</math> cubic centimeters.</p> <p>23. Multiply <math>8 \times 6 = 48</math>, then <math>48 \times 4 = 192</math> cubic inches.</p> <p>24. First find the full volume: <math>10 \times 6 \times 30 = 1800</math> cubic centimeters. Since the box is half full, take half: <math>\frac{1}{2} \times 1800 = 900</math> cubic centimeters.</p> |
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