

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 (in^3) or cubic centimeters (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 cm^3

PRACTICE

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

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|----------------------------------|-------|--------------------------------------|-------|
| 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<sup>3</sup>"/> |
| 10. <input type="text" value="125"/> | 22. <input type="text" value="9000 cm<sup>3</sup>"/> |
| 11. <input type="text" value="144"/> | 23. <input type="text" value="192 in<sup>3</sup>"/> |
| 12. <input type="text" value="200"/> | 24. <input type="text" value="900 cm<sup>3</sup>"/> |

Step-by-Step Explanations

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