Volume of Rectangular Prisms

Name: _____	Date: _____	Score: _____ / 24

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.

1. Prism: $l = 2,\ w = 3,\ h = 4$ _____
2. Prism: $l = 5,\ w = 2,\ h = 3$ _____
3. Prism: $l = 4,\ w = 4,\ h = 4$ _____
4. Prism: $l = 6,\ w = 3,\ h = 2$ _____
5. Prism: $l = 7,\ w = 5,\ h = 2$ _____
6. Prism: $l = 8,\ w = 3,\ h = 3$ _____
7. Prism: $l = 10,\ w = 2,\ h = 5$ _____
8. Prism: $l = 6,\ w = 6,\ h = 3$ _____
9. Prism: $l = 9,\ w = 4,\ h = 2$ _____
10. Prism: $l = 5,\ w = 5,\ h = 5$ _____
11. Prism: $l = 12,\ w = 3,\ h = 4$ _____
12. Prism: $l = 10,\ w = 10,\ h = 2$ _____
13. Prism: $l = 7,\ w = 6,\ h = 5$ _____
14. Prism: $l = 15,\ w = 2,\ h = 4$ _____
15. Prism: $l = 8,\ w = 8,\ h = 8$ _____
16. Prism: $l = 2.5,\ w = 4,\ h = 6$ _____
17. Prism: $l = 3.5,\ w = 2,\ h = 4$ _____
18. Prism: $l = 20,\ w = 5,\ h = 3$ _____
19. Prism: $l = 1.5,\ w = 2.5,\ h = 4$ _____
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. 24	**13.** 210
2. 30	**14.** 120
3. 64	**15.** 512
4. 36	**16.** 60
5. 70	**17.** 28
6. 72	**18.** 300
7. 100	**19.** 15
8. 108	**20.** 99
9. 72	**21.** $4608\ \text{in}^3$
10. 125	**22.** $9000\ \text{cm}^3$
11. 144	**23.** $192\ \text{in}^3$
12. 200	**24.** $900\ \text{cm}^3$

Step-by-Step Explanations

1. Multiply all three: $2 \times 3 \times 4 = 24$.
2. Multiply $5 \times 2 = 10$, then $10 \times 3 = 30$.
3. Multiply $4 \times 4 = 16$, then $16 \times 4 = 64$.
4. Multiply $6 \times 3 = 18$, then $18 \times 2 = 36$.
5. Multiply $7 \times 5 = 35$, then $35 \times 2 = 70$.
6. Multiply $8 \times 3 = 24$, then $24 \times 3 = 72$.
7. Multiply $10 \times 2 = 20$, then $20 \times 5 = 100$.
8. Multiply $6 \times 6 = 36$, then $36 \times 3 = 108$.
9. Multiply $9 \times 4 = 36$, then $36 \times 2 = 72$.
10. Multiply $5 \times 5 = 25$, then $25 \times 5 = 125$.
11. Multiply $12 \times 3 = 36$, then $36 \times 4 = 144$.
12. Multiply $10 \times 10 = 100$, then $100 \times 2 = 200$.
13. Multiply $7 \times 6 = 42$, then $42 \times 5 = 210$.
14. Multiply $15 \times 2 = 30$, then $30 \times 4 = 120$.
15. Multiply $8 \times 8 = 64$, then $64 \times 8 = 512$.
16. Multiply $2.5 \times 4 = 10$, then $10 \times 6 = 60$.
17. Multiply $3.5 \times 2 = 7$, then $7 \times 4 = 28$.
18. Multiply $20 \times 5 = 100$, then $100 \times 3 = 300$.
19. Multiply $1.5 \times 2.5 = 3.75$, then $3.75 \times 4 = 15$.
20. Multiply $11 \times 3 = 33$, then $33 \times 3 = 99$.
21. Multiply length, width, and height: $24 \times 12 = 288$, then $288 \times 16 = 4608$ cubic inches.
22. Multiply $30 \times 20 = 600$, then $600 \times 15 = 9000$ cubic centimeters.
23. Multiply $8 \times 6 = 48$, then $48 \times 4 = 192$ cubic inches.
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.

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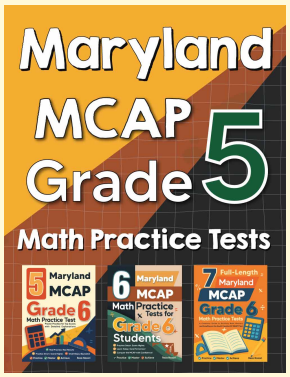

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