

Here Is A Rectangular Prism.work Out The Volume And Round To 3 Significant Figures.7.2cm,8.4cm,18cm

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Introduction to Rectangular Prisms

Understanding the Shape

A rectangular prism, also known as a cuboid, is a three-dimensional geometric shape with six rectangular faces. It has length, width, and height, which are all perpendicular to each other. This shape is common in everyday life, from boxes and containers to buildings and packaging.

Importance of Calculating Volume

Calculating the volume of a rectangular prism helps determine how much space it occupies. This is essential in various fields such as engineering, architecture, logistics, and manufacturing. Knowing the volume allows for efficient use of space and materials.

Given Dimensions of the Prism

The problem provides three dimensions:

- Length = 7.2 cm
- Width = 8.4 cm
- Height = 18 cm

These measurements are crucial for computing the volume.

Understanding Volume of a Rectangular Prism

Mathematical Formula

The volume (V) of a rectangular prism is calculated using the formula:

$$V = \text{length} \times \text{width} \times \text{height}$$

This formula multiplies the three dimensions to give the total volume in cubic centimeters.

Units of Measurement

Since all dimensions are in centimeters, the volume will be in cubic centimeters (cm³).

Step-by-Step Calculation of the Volume

Step 1: Write Down the Dimensions

- Length (L) = 7.2 cm
- Width (W) = 8.4 cm
- Height (H) = 18 cm

Step 2: Apply the Volume Formula

$$V = L \times W \times H$$

Step 3: Multiply the Dimensions

Calculate:

1. Multiply length and width:

$$7.2 \text{ cm} \times 8.4 \text{ cm} = ?$$

2. Multiply the result by height:

$$(\text{result from step 1}) \times 18 \text{ cm} = ?$$

Let's perform these calculations:

$$- 7.2 \times 8.4$$

To multiply:

$$7.2 \times 8.4 = (7.2 \times 8) + (7.2 \times 0.4)$$

$$= (57.6) + (2.88) = 60.48$$

- Now multiply 60.48 by 18:

$$60.48 \times 18 = ?$$

Break down:

$$60.48 \times 10 = 604.8$$

$$60.48 \times 8 = 483.84$$

Add these:

$$604.8 + 483.84 = 1088.64$$

Therefore, the volume is 1088.64 cm^3 .

Rounding to Three Significant Figures

Understanding Significant Figures

Significant figures (often abbreviated as sig figs) are digits in a number that contribute to its precision. When rounding to three significant figures:

- Keep the first three non-zero digits.
- Round the number accordingly based on the digit following the third significant digit.

Applying Rounding Rules

The calculated volume is 1088.64 cm^3 .

- The first three significant figures are "1", "0", and "8".
- The digit after "8" (which is "8" in the hundredths place) determines whether to round up or down.

Since the digit after the third significant figure (the "8" in the thousandths place) is 8 (which is ≥ 5), round up.

Thus:

$$1088.64 \rightarrow 1090 \text{ cm}^3 \text{ (rounded to three significant figures).}$$

Final Answer

The volume of the rectangular prism with dimensions 7.2 cm, 8.4 cm, and 18 cm is approximately 1090 cm^3 when rounded to three significant figures.

Additional Considerations and Insights

Alternative Units of Measurement

While the calculation was performed in cubic centimeters, sometimes volume measurements are needed in liters (L) or cubic meters (m^3):

- $1,000 \text{ cm}^3 = 1 \text{ liter}$
- $1,000,000 \text{ cm}^3 = 1 \text{ m}^3$

In this case, the volume in liters:

$$1090 \text{ cm}^3 \div 1000 = 1.09 \text{ liters.}$$

In cubic meters:

$$1090 \text{ cm}^3 \div 1,000,000 = 0.00109 \text{ m}^3.$$

Practical Applications

Knowing the volume is useful for:

- Packing and storage calculations
- Material estimation
- Manufacturing processes
- Understanding spatial constraints

Common Mistakes to Avoid

- Forgetting to convert units if necessary
- Mixing units of different dimensions
- Rounding too early in calculations
- Using incorrect formulas for different shapes

Summary

Calculating the volume of a rectangular prism involves understanding its dimensions, applying the formula (length $\times$ width $\times$ height), performing the multiplication, and then rounding the result to the required number of significant figures. For the given dimensions of 7.2 cm, 8.4 cm, and 18 cm, the volume is approximately 1090 cm³ when rounded to three significant figures. This process is fundamental in various scientific and practical contexts, enabling precise measurement and efficient planning.

Conclusion

Mastering the calculation of volume for rectangular prisms is a fundamental skill in geometry and real-world applications. It involves straightforward multiplication but requires attention to detail, especially in rounding and unit conversions. Whether designing packaging, building structures, or solving academic problems, understanding how to work out the volume accurately is an essential part of mathematical literacy.

End of Article

Frequently Asked Questions

What is the volume of a rectangular prism with dimensions 7.2 cm, 8.4 cm, and 18 cm?

The volume is calculated by multiplying the length, width, and height: $7.2 \text{ cm} \times 8.4 \text{ cm} \times 18 \text{ cm} = 1,084.032 \text{ cm}^3$. Rounded to 3 significant figures, the volume is 1,080 cm³.

How do you find the volume of a rectangular prism with given dimensions?

To find the volume, multiply the length, width, and height. For example, for 7.2 cm, 8.4 cm, and 18 cm, multiply $7.2 \times 8.4 \times 18$.

What is the rounded volume of the prism with sides 7.2 cm, 8.4 cm, and 18 cm?

The calculated volume is 1,084.032 cm³, which rounds to 1,080 cm³ to 3 significant figures.

Why is it important to round the volume to 3 significant figures?

Rounding to 3 significant figures provides a concise and precise measurement suitable for most practical applications, reducing unnecessary detail.

Can you verify the calculation of the volume for the given rectangular prism?

Yes. Multiplying $7.2 \times 8.4 = 60.48$; then $60.48 \times 18 = 1,088.64 \text{ cm}^3$. Rounded to 3 significant figures, it is $1,090 \text{ cm}^3$.

Is there a discrepancy in the previous calculation? What is the correct volume?

Yes, the initial calculation was slightly off. The correct volume is $1,088.64 \text{ cm}^3$, which rounds to $1,090 \text{ cm}^3$ to 3 significant figures.

How do you ensure accuracy when calculating the volume of a rectangular prism?

Use precise multiplication and round the final answer to the appropriate number of significant figures, ensuring all measurements are in consistent units.

What formula is used to find the volume of a rectangular prism?

The formula is $\text{Volume} = \text{length} \times \text{width} \times \text{height}$.

If the dimensions are 7.2 cm, 8.4 cm, and 18 cm, what is the approximate volume in cubic centimeters?

The approximate volume is $1,090 \text{ cm}^3$ when rounded to 3 significant figures.

How does rounding affect the reported volume in practical situations?

Rounding simplifies measurements, making them easier to communicate and compare, while maintaining acceptable accuracy for most purposes.

Additional Resources

Here Is A Rectangular Prism. Work Out The Volume And Round To 3 Significant Figures.
7.2cm, 8.4cm, 18cm

Understanding the volume of three-dimensional objects is fundamental in fields ranging from architecture and engineering to everyday tasks such as packaging and storage. When dealing with rectangular prisms—also known as cuboids—the calculation of volume is straightforward but requires precision to ensure accuracy. In this article, we will explore the process of calculating the volume of a rectangular prism with dimensions 7.2 cm, 8.4 cm, and 18 cm, and demonstrate how to round the result to three significant figures. This comprehensive guide aims to clarify the concepts involved and provide clarity on applying these calculations in various contexts.

Understanding the Rectangular Prism

What Is a Rectangular Prism?

A rectangular prism is a three-dimensional shape characterized by six rectangular faces, twelve edges, and eight vertices. It is a common geometric figure encountered in everyday life, such as boxes, bricks, and storage containers. The defining feature of a rectangular prism is that all its faces are rectangles, with pairs of opposite faces being congruent.

Key dimensions of a rectangular prism include:

- Length (the longest side)
- Width (the shorter side perpendicular to length)
- Height (the vertical side when placed upright)

In our case, the dimensions provided—7.2 cm, 8.4 cm, and 18 cm—represent the length, width, and height respectively, although their specific labeling depends on orientation.

Significance of Volume Calculation

Calculating the volume of a rectangular prism is essential for:

- Determining the capacity or space it occupies
- Planning for storage or transportation
- Material estimation for manufacturing
- Architectural design and construction

Knowing how to compute volume accurately allows professionals and students to make informed decisions and perform precise measurements in practical scenarios.

Calculating the Volume of a Rectangular Prism

The Formula for Volume

The volume (V) of a rectangular prism is calculated using the simple formula:

$$V = l \times w \times h$$

Where:

- (l) = length
- (w) = width
- (h) = height

This formula stems from basic principles of geometry, considering the area of the base and the height extending perpendicular to that base.

Applying the Formula with Given Dimensions

Given:

- Length $(l = 7.2\text{ cm})$
- Width $(w = 8.4\text{ cm})$
- Height $(h = 18\text{ cm})$

Calculating step-by-step:

1. Multiply length and width:

$$7.2\text{ cm} \times 8.4\text{ cm} = ?$$

Calculating:

$$(7.2 \times 8.4)$$

Breaking it down:

- $(7.2 \times 8 = 57.6)$
- $(7.2 \times 0.4 = 2.88)$

Adding these:

$$57.6 + 2.88 = 60.48\text{ cm}^2$$

2. Multiply the result by height:

$$60.48\text{ cm}^2 \times 18\text{ cm} = ?$$

Calculating:

$$(60.48 \times 18)$$

Breaking it down:

$$- (60.48 \times 10 = 604.8)$$

$$- (60.48 \times 8 = 483.84)$$

Adding:

$$[604.8 + 483.84 = 1088.64 \text{ cm}^3]$$

Therefore, the volume:

$$[V = 1088.64 \text{ cm}^3]$$

Rounding to Three Significant Figures

Understanding Significant Figures

Significant figures are critical in scientific measurements, reflecting the precision of a value. When rounding to three significant figures, the goal is to express the number with three meaningful digits, maintaining the accuracy of the original measurement as much as possible.

In our case, the volume 1088.64 cm^3 should be rounded to three significant figures.

Procedure for Rounding

To round 1088.64 to three significant figures:

1. Identify the first three significant digits:

- Digits: 1, 0, 8

- The number is 1,088.64

2. Look at the digit immediately after the third significant digit:

- The fourth digit is 8 (in the thousandths place after the third digit)

3. Round up if this digit is 5 or more:

- Since $8 \geq 5$, we round the third digit up from 8 to 9

4. Adjust the remaining digits accordingly, replacing digits after the third significant figure with zeros or removing them for clarity.

Thus, the rounded volume:

$$1.09 \times 10^3 \text{ cm}^3$$

or simply:

$$\boxed{1.09 \times 10^3 \text{ cm}^3}$$

which is equivalent to 1090 cm^3 when expressed as a rounded number to three significant figures.

Final answer:

The volume of the rectangular prism with dimensions 7.2 cm, 8.4 cm, and 18 cm is approximately $1.09 \times 10^3 \text{ cm}^3$, or 1090 cm^3 when rounded to three significant figures.

Practical Implications of Volume Calculation

Real-World Applications

Knowing how to accurately compute and round the volume of a rectangular prism has numerous applications:

- Packaging and Shipping: Ensuring the container size matches the product volume for optimal packing.
- Construction: Calculating the amount of materials needed, such as concrete or insulation.
- Manufacturing: Designing products with precise capacity requirements.
- Education: Developing students' understanding of geometric principles and measurement techniques.

Considerations for Accurate Measurement

When applying these calculations in practice, it's important to consider:

- Measurement Precision: Use tools that provide measurements with appropriate precision.
- Dimension Labeling: Clearly identify which dimensions correspond to length, width, and height to avoid confusion.
- Unit Consistency: Maintain consistent units throughout calculations.
- Significant Figures: Round results appropriately to reflect the precision of initial measurements.

Conclusion

Calculating the volume of a rectangular prism is a fundamental skill that combines understanding geometric formulas with precise measurement and rounding techniques. In our example, with dimensions of 7.2 cm, 8.4 cm, and 18 cm, the computed volume is approximately 1090 cm^3 when rounded to three significant figures. This process underscores the importance of accuracy and clarity in mathematical computations, whether for academic purposes, engineering projects, or everyday practical tasks.

Mastering such calculations not only enhances mathematical literacy but also equips individuals with essential skills applicable across various industries and disciplines. As we navigate a world filled with three-dimensional objects, the ability to determine their volume accurately remains an invaluable skill—whether designing new products, planning storage solutions, or simply understanding the space around us.

[Here Is A Rectangular Prism Work Out The Volume And Round To 3 Significant Figures 7 2cm 8 4cm 18cm](#)

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