

The Area Of A Rectangle Is 144cm Squared.if The Length Is 16cm. What's The Perimeter?

The Area Of A Rectangle Is 144cm Squared. If The Length Is 16cm, What's The Perimeter?

Understanding the relationship between the area, length, width, and perimeter of a rectangle is fundamental in geometry. In this article, we explore how to determine the perimeter of a rectangle when given its area and length. Specifically, the problem states that the area of a rectangle is 144 square centimeters, and its length is 16 centimeters. We'll walk through the process step-by-step, explaining the key concepts and calculations involved, so you can confidently solve similar problems in the future.

Understanding the Basics: Area and Perimeter of a Rectangle

Before diving into the calculations, it's essential to understand what area and perimeter mean in the context of rectangles.

What Is the Area of a Rectangle?

The area of a rectangle measures the space contained within its boundaries. It is calculated by multiplying the length by the width:

- **Area (A) = Length (L) × Width (W)**

The units are squared because they represent a two-dimensional space—in this case, square centimeters (cm²).

What Is the Perimeter of a Rectangle?

The perimeter is the total length around the rectangle. It is calculated by adding the lengths of all four sides or, more simply, by the formula:

- **Perimeter (P) = 2 × (Length + Width)**

Knowing the perimeter helps in tasks such as fencing a yard or framing a picture.

Given Data and What We Need to Find

The problem provides:

- Area, $A = 144 \text{ cm}^2$
- Length, $L = 16 \text{ cm}$

Our goal is to find the perimeter, P , of the rectangle.

Step-by-Step Solution to Find the Perimeter

Step 1: Find the Width of the Rectangle

Using the formula for the area:

- $A = L \times W$

We can substitute the known values:

- $144 = 16 \times W$

To find W , divide both sides by 16:

- $W = 144 \div 16 = 9 \text{ cm}$

Result: The width of the rectangle is 9 centimeters.

Step 2: Calculate the Perimeter

Now that we have both the length and width, we can find the perimeter:

- $P = 2 \times (L + W)$

Substitute the known values:

- $P = 2 \times (16 + 9) = 2 \times 25 = 50 \text{ cm}$

Final Result: The perimeter of the rectangle is 50 centimeters.

Additional Insights and Variations

Understanding how to manipulate these formulas is useful for solving a variety of geometry problems. Let's explore some common variations.

1. If the Perimeter Is Known, Find the Width

Suppose you are given the perimeter and length, and need to find the width:

- Perimeter, $P = 50 \text{ cm}$
- Length, $L = 16 \text{ cm}$

Rearranged perimeter formula:

- $P = 2 \times (L + W)$

Solve for W:

- $W = (P \div 2) - L$
- $W = (50 \div 2) - 16 = 25 - 16 = 9 \text{ cm}$

The width is 9 cm, matching our previous calculation.

2. If the Width Is Known, Find the Area

Given:

- Width, $W = 9 \text{ cm}$

- Length, $L = 16 \text{ cm}$

Calculate the area:

- $A = L \times W = 16 \times 9 = 144 \text{ cm}^2$

This confirms the consistency of the calculations.

Practical Applications of Calculating Perimeter and Area

Understanding these concepts has real-world applications, such as:

- Designing fencing for a rectangular garden
- Determining the amount of material needed for framing or border decoration
- Calculating the space available for flooring or tiling

By mastering the process of finding width from area and then perimeter, you can efficiently solve many practical problems.

Tips for Solving Similar Geometry Problems

To enhance your problem-solving skills, keep these tips in mind:

- Always write down what is given and what you need to find.
- Recall the basic formulas for area and perimeter of rectangles.
- Use algebra to rearrange formulas as needed to find unknown variables.
- Check your units to ensure consistency throughout calculations.
- Verify your answers by plugging your results back into the original formulas.

Summary

In summary, given that the area of a rectangle is 144 cm^2 and its length is 16 cm , you can find the width by dividing the area by the length, resulting in a width of 9 cm . Subsequently, calculating the perimeter involves adding the length and width, then multiplying by 2, yielding a perimeter of 50 cm . This approach demonstrates how basic formulas and algebra work together to solve geometry problems efficiently.

By understanding these principles, you can confidently tackle similar questions involving rectangles, whether in academic settings or practical scenarios like construction, design, or crafts. Practice with different values and configurations to strengthen your skills and deepen your understanding of the relationships between area, perimeter, length, and width in rectangles.

Frequently Asked Questions

Given the area of a rectangle is 144cm^2 and the length is 16cm , how do you find the width?

Use the formula for area: $\text{Area} = \text{length} \times \text{width}$. So, $\text{width} = \text{Area} \div \text{length} = 144\text{cm}^2 \div 16\text{cm} = 9\text{cm}$.

What is the perimeter of the rectangle if the length is 16cm and the width is 9cm ?

$\text{Perimeter} = 2 \times (\text{length} + \text{width}) = 2 \times (16\text{cm} + 9\text{cm}) = 2 \times 25\text{cm} = 50\text{cm}$.

How do you derive the width of a rectangle when given the area and length?

Divide the area by the length: $\text{width} = \text{area} \div \text{length}$. In this case, $144\text{cm}^2 \div 16\text{cm} = 9\text{cm}$.

If the length of the rectangle changes but the area remains 144cm^2 , how does the perimeter change?

The perimeter depends on both length and width. If length increases, width decreases to keep the area constant, affecting the perimeter accordingly.

Can the length of 16cm be used to find the perimeter of any rectangle with area 144cm^2 ?

Yes, as long as you know the specific width that results from the given area, you can find the perimeter using the sum of length and width.

What is the importance of understanding the relationship

between area, length, width, and perimeter in rectangles?

It helps in solving geometric problems efficiently, such as calculating missing dimensions and understanding the properties of shapes.

How would the perimeter change if the rectangle's length was 12cm instead of 16cm, keeping the area 144cm²?

Calculate width: $144\text{cm}^2 \div 12\text{cm} = 12\text{cm}$. Then, perimeter = $2 \times (12\text{cm} + 12\text{cm}) = 48\text{cm}$, which is less than when the length was 16cm.

Additional Resources

The Area Of A Rectangle Is 144cm Squared. If The Length Is 16cm. What's The Perimeter? This problem presents a classic application of basic geometry principles, specifically involving the relationships between the area, length, width, and perimeter of a rectangle. Understanding how to find the perimeter when given the area and one side length is fundamental for students and enthusiasts alike, as it reinforces the concepts of multiplication, division, and geometric reasoning. In this comprehensive review, we will explore the step-by-step process to solve this problem, delve into the underlying concepts of rectangles, discuss common misconceptions, and highlight the importance of mastering such problems in real-world contexts.

Understanding the Basics: Area and Perimeter of a Rectangle

What Is the Area of a Rectangle?

The area of a rectangle measures the total surface enclosed within its sides, expressed in square units. The formula for calculating the area is:

$$[\text{Area}] = [\text{length}] \times [\text{width}]$$

In this problem, the area is given as 144 cm², which indicates the total space covered by the rectangle.

What Is the Perimeter of a Rectangle?

The perimeter refers to the total length around the rectangle—the sum of all four sides. The formula is:

$$[\text{Perimeter}] = 2 \times ([\text{length}] + [\text{width}])$$

Calculating the perimeter requires knowing both the length and the width, which leads us to the next step: finding the width.

Step-by-Step Solution to the Problem

Given Data

- Area = 144 cm^2
- Length = 16 cm

Step 1: Find the Width

Since the area $(A = \text{length} \times \text{width})$, we can rearrange to find the width:

$$\text{width} = \frac{\text{area}}{\text{length}}$$

Substituting the known values:

$$\text{width} = \frac{144 \text{ cm}^2}{16 \text{ cm}} = 9 \text{ cm}$$

This step demonstrates the importance of understanding inverse operations—dividing the area by the length to find the unknown width.

Step 2: Calculate the Perimeter

Now that both dimensions are known:

- Length = 16 cm
- Width = 9 cm

Apply the perimeter formula:

$$\text{Perimeter} = 2 \times (16 \text{ cm} + 9 \text{ cm}) = 2 \times 25 \text{ cm} = 50 \text{ cm}$$

Thus, the perimeter of the rectangle is 50 cm .

Deeper Insights and Conceptual Understanding

Why is the problem straightforward?

The problem leverages fundamental algebra and geometry concepts. Recognizing that the area formula can be rearranged to solve for an unknown dimension is a key skill. The straightforward division to find width emphasizes the importance of understanding the relationships between area and sides.

Common misconceptions and pitfalls

- Assuming the width equals the length: The problem specifies the length, and the width must be calculated separately.
- Incorrectly calculating perimeter: Some might forget to multiply by 2 or add the sides correctly.

- Misinterpreting units: Ensuring units are consistent is crucial—here, all units are in centimeters, so the calculations are straightforward.

Features of this problem-solving approach

- Emphasizes algebraic manipulation
- Reinforces geometric formulas
- Demonstrates the importance of understanding inverse operations
- Highlights real-world relevance in measuring spaces and materials

Practical Applications of Understanding Rectangles

In Architecture and Design

Calculating area and perimeter helps architects determine materials needed for flooring, walls, or fencing. For example, knowing a room's dimensions allows for accurate planning.

In Manufacturing

Product designers need to calculate the surface area for painting or coating and the perimeter for framing or edging.

In Education

Problems like this serve as foundational exercises in math curricula, developing problem-solving skills and understanding geometric relationships.

Pros and Cons of the Approach

Pros:

- Simple and direct application of formulas
- Reinforces algebraic manipulation skills
- Provides a clear understanding of the relationships between area, sides, and perimeter
- Easily adaptable to similar problems with different measurements

Cons:

- Assumes familiarity with basic formulas
- Does not address irregular or complex shapes
- May oversimplify real-world scenarios where measurements are approximate

- Focuses on calculation without exploring geometric transformations or other advanced concepts

Additional Tips for Solving Similar Problems

- Always identify what is given and what needs to be found.
- Write down relevant formulas clearly before substituting values.
- Check units to ensure consistency.
- Use inverse operations to find unknown dimensions.
- Verify the reasonableness of your answer—perimeter should be larger than any single side and consistent with the shape.

Conclusion: Mastering the Relationship Between Area and Perimeter

Understanding how to determine the perimeter of a rectangle given its area and one side length is a fundamental skill that underpins more advanced geometric concepts. This problem exemplifies the importance of algebra in geometry, demonstrating how simple formulas can be combined to solve real-world problems effectively. Whether in academic settings, construction, or design, mastering these basic calculations provides a strong foundation for more complex mathematical reasoning. By breaking down the problem step-by-step, recognizing the underlying relationships, and applying the appropriate formulas, learners can confidently approach similar challenges and develop a deeper appreciation for the elegance of geometry.

[The Area Of A Rectangle Is 144cm Squared If The Length Is 16cm What S The Perimeter](#)

The Area Of A Rectangle Is 144cm Squared If The Length Is 16cm What S The Perimeter

Related Articles

- [Find The Mean Of The Sampling Distribution Of Sample Means Using The Given Information](#)
- [Solve 2.1 To The 3rd Decimal Point Using Taylor Series Centered At 0. Let \$F\(x\) = 2+x\$](#)
- [Got It? Do These Problems Solve Each System Of Equations 1. \$Y=xy = 2x - 4\$ answer 10642010](#)

[Back to Home](#)