

A Shape Is Made Of 3 Identical Squares, The Area Of The Shape Is 75cm^2 , What Is The Perimeter Of The Shape?

A Shape Is Made Of 3 Identical Squares, The Area Of The Shape Is 75cm^2 , What Is The Perimeter Of The Shape?

Understanding geometric shapes and their properties is fundamental in mathematics, especially in areas such as area, perimeter, and shape composition. When a shape is formed by combining multiple identical squares, it offers an excellent opportunity to explore how dimensions relate to each other and how to calculate key measurements like perimeter. In this article, we will analyze a specific problem: a shape made of three identical squares with a total area of 75 cm^2 , and we'll determine its perimeter. This example not only illustrates the application of basic geometric principles but also provides insights into problem-solving strategies that can be applied to similar shape-related questions.

Understanding the Problem

Before diving into calculations, it's essential to interpret the problem carefully:

- The shape is composed of 3 identical squares.
- The total combined area of these squares is 75 cm^2 .
- The goal is to find the perimeter of the entire shape.

This problem involves understanding how the individual squares are arranged, their size, and how their arrangement affects the perimeter.

Key Concepts and Definitions

Area of a Square

The area of a square is calculated using the formula:

$$\text{Area} = \text{side}^2$$

where the side length is the length of one side of the square.

Perimeter of a Square

The perimeter of a square is:

$$\text{Perimeter} = 4 \times \text{side}$$

Shape Arrangement and Its Impact on Perimeter

The total perimeter of a shape made of multiple squares depends on how these squares are arranged:

- Linear arrangement (all squares in a row or column)
- L-shaped arrangement
- Other complex arrangements

The arrangement affects how many external sides are exposed and thus influences the total perimeter.

Step-by-Step Solution

To determine the perimeter, we follow these steps:

Step 1: Find the area of one square

Since the total area of the three squares is 75 cm², and all squares are identical, the area of each square is:

$$\text{Area of one square} = \frac{\text{Total area}}{3} = \frac{75}{3} = 25 \text{ cm}^2$$

Step 2: Calculate the side length of each square

Using the area formula:

$$\text{side}^2 = 25 \text{ cm}^2$$

$$\text{side} = \sqrt{25} = 5 \text{ cm}$$

Each square has a side length of 5 cm.

Step 3: Determine possible arrangements of the three squares

Since the squares are identical and can be arranged in various ways, the most common arrangements are:

- Straight line (all three squares in a row or column)
- L-shape (two squares aligned, the third attached at an adjacent side)
- Other complex shapes (less common for such basic problems)

For simplicity, and because the problem asks for the perimeter of "the shape" made of three squares, we will explore both the linear and L-shaped arrangements, which are typical in such problems.

Calculating the Perimeter for Different Arrangements

Scenario 1: Linear Arrangement

Description: All three squares are aligned in a straight line, either horizontally or vertically.

Perimeter Calculation:

- Total length of the shape:

$$\text{Length} = 3 \times 5 \text{ cm} = 15 \text{ cm}$$

- Total height:

$$5 \text{ cm} \text{ (since all squares are aligned)}$$

- External perimeter:

$$\text{Perimeter} = 2 \times (\text{length} + \text{height})$$

$$= 2 \times (15 \text{ cm} + 5 \text{ cm}) = 2 \times 20 \text{ cm} = 40 \text{ cm}$$

Result: The perimeter of the shape in a linear arrangement is 40 cm.

Scenario 2: L-Shaped Arrangement

Description: Two squares are aligned horizontally, and the third is attached to one end, forming an L shape.

Visual Representation:

```
  \ \
■ ■
■
  \ \
```

or rotated versions.

Perimeter Calculation:

- The perimeter includes all outer sides, but shared sides between squares are internal and do not contribute to the outside perimeter.

- Total outline:

- The shape has a "staircase" outline, with some sides shared.

- Calculations:

- The total length of the outer boundary:

- Horizontal sides:

- Length of top side: 2 sides of 5 cm each (top row)

- The bottom side: 2 sides (bottom row), with appropriate adjustments

- Vertical sides:

- Two sides of 5 cm for the outermost left and right sides

- The vertical segment on the inside where the squares are attached

- Simplified, the perimeter of an L-shape made of three 5 cm squares is:

$$[\text{Perimeter}] = 4 \times \text{side} + 2 \times \text{side} = (4 + 2) \times 5, \text{cm} = 6 \times 5, \text{cm} = 30, \text{cm}$$

However, a precise perimeter calculation considering the shape's outline yields 30 cm.

Result: The perimeter of the shape in an L arrangement is approximately 30 cm.

Summary of Findings

Arrangement	Perimeter (cm)
Linear (all three squares in a row)	40 cm
L-shaped (two squares aligned, third attached)	30 cm

Note: The exact perimeter depends on the shape’s arrangement. Since the problem does not specify the arrangement, both common possibilities are explored.

Additional Considerations

- If the shape is arranged differently, the perimeter could vary.
- For irregular arrangements, the perimeter can be calculated by tracing the outer boundary, considering shared sides.
- The key is understanding how the arrangement affects the external perimeter.

Conclusion

In conclusion, when a shape is made of three identical squares with a total area of 75 cm², each square has an area of 25 cm² and a side length of 5 cm. Depending on how these squares are arranged, the perimeter of the shape can vary:

- Linear arrangement: perimeter is 40 cm.
- L-shaped arrangement: perimeter is 30 cm.

This analysis highlights the importance of shape configuration in geometric calculations and demonstrates how to approach similar problems involving composite shapes.

Final Tips for Solving Similar Geometry Problems

- Always break down the problem into smaller parts.
- Calculate the dimensions of individual components first.

- Consider all possible arrangements to understand how shape configuration affects measurements.
- Visualize the shape or sketch it for clarity.
- Use known formulas for area and perimeter, adapting them based on the shape's arrangement.

By mastering these strategies, you can confidently tackle a wide range of geometry problems involving composite shapes made of squares, rectangles, and other polygons.

Keywords for SEO optimization:

- shape made of 3 squares
- total area 75 cm²
- perimeter of composite shape
- how to find perimeter of shape with squares
- geometric shape problems
- calculating perimeter of L-shaped figure
- area and perimeter of squares
- arrangement of squares and perimeter calculation

Frequently Asked Questions

What is the side length of each square in the shape if the total area is 75 cm²?

Since the shape is made of 3 identical squares with a total area of 75 cm², each square has an area of 25 cm². The side length of each square is $\sqrt{25} = 5$ cm.

How are the 3 squares arranged to form the shape in question?

The squares are typically arranged either in a straight line or in an L-shape. Given the area and the shape description, a common arrangement is in a straight line or forming a rectangular shape.

What is the perimeter of a shape made of 3 squares arranged in a straight line?

If the squares are arranged in a straight line, each with side length 5 cm, the perimeter is calculated as 2 times the sum of the length and height: $2 \times (15 \text{ cm} + 5 \text{ cm}) = 2 \times 20 \text{ cm} = 40 \text{ cm}$.

What is the perimeter of the shape if the 3 squares are arranged in an L-shape?

In an L-shape arrangement with side length 5 cm, the perimeter would be 5 cm (bottom) + 15 cm (along the longer side) + 5 cm (vertical side) + 15 cm (top horizontal) + 5 cm (vertical side) = 45 cm.

Can the perimeter differ based on the arrangement of the squares?

Yes, the perimeter varies depending on whether the squares are aligned in a straight line or arranged in an L-shape or other configurations. The shape's perimeter depends on how the squares are connected.

What is the key to solving the perimeter of this shape?

The key is to determine the arrangement of the squares, find the side length from the area, and then calculate the perimeter based on that configuration.

If the squares are arranged in a straight line, what is the perimeter of the shape?

The perimeter is 40 cm when the 3 squares are aligned in a straight line, each with side length 5 cm, resulting in a total perimeter of $2 \times (15 + 5) = 40$ cm.

Additional Resources

A Shape Is Made Of 3 Identical Squares, The Area Of The Shape Is 75cm^2 , What Is The Perimeter Of The Shape?

An Investigative Exploration into Geometric Reasoning and Problem-Solving

Introduction

Mathematics often presents us with intriguing puzzles that challenge our understanding of basic geometric principles and spatial reasoning. One such problem asks: "A shape is made of 3 identical squares. The area of the shape is 75cm^2 . What is the perimeter of the shape?" This question, seemingly straightforward at first glance, opens the door to a deeper exploration of how shapes are constructed, how areas and perimeters relate, and the importance of visual reasoning in problem-solving.

In this article, we will undertake a comprehensive investigation into this problem, analyzing possible configurations, deducing the dimensions of the

individual squares, and calculating the perimeter based on different arrangements. Our goal is to clarify the reasoning process involved, explore alternative interpretations, and ultimately arrive at a well-supported conclusion.

Understanding the Given Data

The Basic Components

- The shape is composed of 3 identical squares.
- The total area of the shape is 75cm^2 .

Implications

Since the shape is made of three identical squares, each square must have an area of:

$$\begin{aligned} \text{Area of each square} &= \frac{\text{Total area}}{3} = \frac{75\text{cm}^2}{3} \\ &= 25\text{cm}^2 \end{aligned}$$

This leads us to determine the side length of each individual square.

Determining the Side Length of the Squares

Calculating the Side Length

Given that each square has an area of 25cm^2 :

$$\begin{aligned} \text{Side length (s)} &= \sqrt{\text{Area}} = \sqrt{25\text{cm}^2} = 5\text{cm} \end{aligned}$$

Thus, each square has a side length of 5 cm.

Visualizing Possible Arrangements

The key to solving the perimeter problem lies in understanding how these three squares are arranged relative to each other.

Arrangement Possibilities

1. Linear Arrangement (Straight Line)

The three squares are placed edge-to-edge in a straight line.

2. L-Shaped Arrangement

Two squares are aligned, and the third is attached at a right angle, forming an "L" shape.

3. Other Configurations

Such as a T-shape, a square with a protruding square, or more complex arrangements, although these are less likely given the simplicity of the problem.

Analyzing Each Arrangement

1. Linear Arrangement

Description

Three squares placed consecutively along a straight line, sharing common edges.

Dimensions

- Length of the shape:

Since each square has a side of 5 cm and they are aligned horizontally, the total length becomes:

$$\begin{aligned} & \backslash [\\ & \text{Total length} = 3 \times 5 \text{ cm} = 15 \text{ cm} \\ & \backslash] \end{aligned}$$

- Width of the shape:

The width remains 5 cm (the height of a single square).

Perimeter Calculation

The perimeter of a rectangle with length (L) and width (W) is:

$$\begin{aligned} & \backslash [\\ & P = 2(L + W) \\ & \backslash] \end{aligned}$$

Applying to our shape:

$$\begin{aligned} & \backslash [\\ & P = 2(15 \text{ cm} + 5 \text{ cm}) = 2(20 \text{ cm}) = 40 \text{ cm} \\ & \backslash] \end{aligned}$$

Perimeter in linear arrangement: 40 cm

2. L-Shaped Arrangement

Description

Two squares aligned horizontally, with the third attached to one end, forming an "L."

Visualizing the Shape

- The base: two squares side-by-side, length = $(2 \times 5\text{ cm} = 10\text{ cm})$
- The height: 5 cm (the side of the third square)
- The third square attached vertically at one end of the base.

Dimensions

- Width:

The maximum width is:

```
\[
\text{Max width} = 10\text{ cm} \quad (\text{from the base}) \quad \\\
\text{or} \quad 5\text{ cm} + 5\text{ cm} = 10\text{ cm} \quad (\text{if the third square} \\
\text{extends out})
\]
```

- Height:

The height of the shape is:

```
\[
\text{Height} = 5\text{ cm} + 5\text{ cm} = 10\text{ cm}
\]
```

but because the third square is attached at the end, the overall shape looks like a corner with a vertical and horizontal component.

Perimeter Calculation

To compute the perimeter, we can trace around the shape:

- Starting from the bottom-left corner:
- Move right 10 cm (bottom edge of two squares)
- Move up 5 cm (to the top of the first square)
- Move right 5 cm (top of the third square)
- Move up 5 cm (height of the third square)
- Move left 5 cm (top of the third square)
- Move down 5 cm (to align with the bottom of the third square)
- Move left 10 cm (along the bottom of the base)
- Move up 5 cm (to complete the shape)

Adding the segments:

```
\[
```

```
\text{Perimeter} = 10 + 5 + 5 + 5 + 5 + 5 + 10 + 5 = 50\,cm
\]
```

Alternatively, more precise tracing confirms the perimeter as 50 cm.

3. Other Configurations

While theoretically possible, more complex configurations tend to increase the perimeter, making the linear and L-shaped arrangements the most plausible solutions given the simplicity of the problem.

Comparing the Arrangements and Their Perimeters

Arrangement	Perimeter	Remarks
Linear (straight line)	40 cm	Compact, minimal perimeter for given area
L-Shaped (corner)	50 cm	More spread out, larger perimeter

Deduction and Final Answer

Given the problem's simplicity and typical geometric reasoning, the arrangement most often considered is the linear configuration, which yields a perimeter of 40 cm.

Why?

- The problem states "A shape is made of 3 identical squares" but does not specify the shape's configuration.
- The minimal perimeter configuration for a given area is generally the most straightforward (linear).
- The area and side length calculations confirm the size of each square.
- The linear arrangement produces a perimeter consistent with the mathematical reasoning.

Final Answer:

> The perimeter of the shape is 40 centimeters.

Broader Implications and Educational Significance

This investigation highlights several important aspects of mathematical problem-solving:

- Dimension Analysis: Calculating side lengths from area data is fundamental in geometry.
- Visualization: Drawing possible arrangements aids comprehension and solution accuracy.
- Perimeter vs. Area Relations: Recognizing how shape configuration impacts perimeter.
- Problem Assumptions: Clarifying assumptions when the problem is ambiguous—here, the linear arrangement is the most logical.

Moreover, the problem serves as an excellent educational tool, demonstrating how simple geometric principles can be combined with logical reasoning to solve real-world-like puzzles.

Conclusion

Through a detailed exploration of possible arrangements, calculation of individual square dimensions, and perimeter assessment, we conclude that the most reasonable and mathematically consistent perimeter for the shape composed of three identical 5 cm squares with a total area of 75cm^2 is 40 cm. This exercise underscores the importance of visualization, assumption clarity, and systematic reasoning in solving geometric problems.

In essence, understanding the fundamental properties of shapes and their arrangements paves the way for accurate problem-solving and insightful mathematical reasoning.

[A Shape Is Made Of 3 Identical Squares The Area Of The Shape Is \$75\text{cm}^2\$ What Is The Perimeter Of The Shape](#)

A Shape Is Made Of 3 Identical Squares The Area Of The Shape Is 75cm^2 What Is The Perimeter Of The Shape

Related Articles

- [This Year, 17,884 People Attended A Basketball Team's First Game, And 17,150 People Attended Their Second](#)
- [A Cannonball And A Marble Roll Without Slipping From Rest Down An Incline. Which Gets To The Bottom First?](#)
- [Through Condensation Reactions, Many Amino Acids Are Bound Together To Form What? Group Of Answer Choices](#)

[Back to Home](#)