

Find The Distance Travelled By Rubina If She Takes 4 Rounds Of Rectangular Park Whose Length And Breadth

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When planning a walk or a jog around a park, understanding the distance covered is essential for tracking fitness goals or simply satisfying curiosity. In this article, we explore how to calculate the total distance Rubina will travel if she completes four rounds of a rectangular park, given the park's length and breadth. Accurate calculation involves understanding the park's perimeter and multiplying it appropriately. Whether you're a student learning geometry or a fitness enthusiast planning your workout, this guide will help you grasp the process effectively.

Understanding the Dimensions of the Rectangular Park

Before calculating the total distance, it's crucial to understand the basic dimensions involved.

What Are Length and Breadth?

- Length: The longer side of the rectangle.
- Breadth: The shorter side of the rectangle.

In our context, the park's shape is rectangular, meaning it has four sides with opposite sides equal.

Given Data

- Length of the park = L meters
- Breadth of the park = B meters

The actual numerical values of L and B will be essential for precise calculations, but the process remains the same regardless of the specific measurements.

Calculating the Perimeter of the Rectangular Park

The perimeter of a rectangle is the total distance around it, which is the sum of all its sides.

Formula for Perimeter

The perimeter (P) of a rectangle is calculated as:

$$P = 2 \times (L + B)$$

Where:

- L = length of the rectangle
- B = breadth of the rectangle

Example Calculation

Suppose:

- Length (L) = 50 meters
- Breadth (B) = 30 meters

Then:

$$P = 2 \times (50 + 30) = 2 \times 80 = 160 \text{ meters}$$

This means walking once around the park covers 160 meters.

Determining the Total Distance for 4 Rounds

Once the perimeter is known, calculating the total distance Rubina travels after 4 rounds is straightforward.

Step-by-Step Calculation

1. Calculate the perimeter of the park.
2. Multiply the perimeter by 4, since Rubina completes four laps.

Using the previous example:

$$\text{Total Distance} = 4 \times 160 = 640 \text{ meters}$$

Hence, Rubina will have traveled 640 meters after four rounds.

Generalized Formula for Total Distance

For any given dimensions, the total distance (D) traveled after completing 4 rounds is:

$$D = 4 \times 2 \times (L + B) = 8 \times (L + B)$$

This formula simplifies the process and allows quick computation without recalculating the perimeter each time.

Calculating for Different Dimensions

Let's consider some different scenarios to illustrate the versatility of this method.

Scenario 1

- Length = 60 meters
- Breadth = 40 meters

Total distance:

$$D = 8 \times (60 + 40) = 8 \times 100 = 800 \text{ meters}$$

Scenario 2

- Length = 100 meters
- Breadth = 50 meters

Total distance:

$$D = 8 \times (100 + 50) = 8 \times 150 = 1200 \text{ meters}$$

These examples showcase how the calculation adapts to various park sizes.

Importance of Accurate Measurements

To ensure precise calculation of the total distance:

- Use a measuring tape or a measuring wheel for larger parks.
- Verify the length and breadth with multiple measurements for accuracy.
- Convert measurements to consistent units (meters, feet, etc.) before calculations.

Accurate measurements lead to reliable results, which are especially important for fitness tracking, event planning, or academic purposes.

Real-world Applications of the Calculation

Understanding how to find the total distance traveled in a rectangular park has several practical applications:

Fitness Tracking

- Runners and walkers can plan their workouts based on known distances.
- Helps in setting daily or weekly exercise goals.

Event Planning

- Organizers can estimate the length of running events or marathons held in parks.
- Ensures safety and logistics planning based on the route length.

Educational Purposes

- Students learning geometry can see real-world applications of perimeter calculations.
- Enhances understanding of shapes and measurements.

Additional Tips for Accurate Calculation

- Always double-check measurements for accuracy.
- Use consistent units throughout the calculation.
- For irregularly shaped parks, break the shape into rectangles or other polygons and sum their perimeters.
- Consider pathways or obstacles that may affect the actual walking distance if not following the perimeter exactly.

Conclusion

Calculating the distance Rubina travels after four rounds of a rectangular park involves understanding the dimensions of the park and applying basic geometric formulas. The key steps include determining the perimeter using the length and breadth, then multiplying by four for the total distance. This process is simple yet powerful, applicable to various sizes and scenarios. Whether for fitness, event planning, or educational purposes, mastering this calculation enhances your understanding of geometry and practical measurement skills.

Remember, accurate measurements and calculations not only help in achieving fitness goals but also foster a deeper appreciation for the geometric principles that shape our everyday environments. So next time you plan a walk around a park, you'll know exactly how to find the total distance covered in multiple rounds!

Frequently Asked Questions

How do I calculate the total distance traveled by Rubina if she completes 4 rounds of a rectangular park?

To find the total distance, first determine the perimeter of the rectangular park (2 times the sum of length and breadth), then multiply that perimeter by 4 to get the total distance traveled in 4 rounds.

What is the formula to find the perimeter of a rectangular park?

The perimeter (P) of a rectangle is calculated using the formula $P = 2 \times (\text{length} + \text{breadth})$.

If the length of the park is 150 meters and the breadth is 100 meters, what is the total distance Rubina travels after 4 rounds?

First, find the perimeter: $2 \times (150 + 100) = 2 \times 250 = 500$ meters. Then, multiply by 4: $4 \times 500 = 2000$ meters. So, Rubina travels 2000 meters in 4 rounds.

Why is calculating the perimeter important in determining the distance traveled in rounds?

Because each round around the park covers a distance equal to its perimeter, calculating the perimeter allows you to determine the total distance traveled after multiple rounds.

Can the same method be applied if the park has irregular shape?

No, this method is specific to rectangular shapes. For irregular shapes, you would need to find the total boundary length (perimeter) through other means or measurements.

How can I visualize the total distance Rubina will travel after completing 4 rounds?

Imagine walking around the rectangle 4 times; each lap covers the perimeter distance. Multiplying the perimeter by 4 gives you the total distance traveled, which can be visualized as four complete circuits around the park.

Additional Resources

Find The Distance Travelled By Rubina If She Takes 4 Rounds Of Rectangular Park Whose Length And Breadth is a classic problem that combines basic geometry with real-world application. This problem not only tests fundamental mathematical skills but also encourages a practical understanding of how to calculate distances when moving along geometric paths. In this article, we will explore the problem in detail, analyze the necessary calculations, discuss various factors that influence the distance, and consider real-life scenarios where such calculations are useful. Whether you're a student preparing for exams or someone interested in mathematical reasoning, understanding how to find the total distance traveled around a rectangular park is a valuable skill.

Understanding the Problem

Before diving into calculations, it's essential to understand what the problem entails. The question asks for the total distance Rubina travels after completing 4 rounds around a rectangular park with given length and breadth. The key components are:

- The shape of the park: Rectangular
- The number of rounds: 4
- The dimensions: Length and Breadth

The problem implicitly assumes that Rubina walks along the perimeter of the park, covering the same path in each round.

Breaking Down the Key Concepts

Perimeter of a Rectangle

The perimeter of a rectangle is the total distance around its boundary. It is calculated using the formula:

$$\text{Perimeter (P)} = 2 \times (\text{Length} + \text{Breadth})$$

Understanding this formula is fundamental because the total distance Rubina travels after 4 rounds will be four times the perimeter.

Calculating Total Distance

Once the perimeter is known, the total distance traveled after multiple rounds is straightforward:

$$\text{Total Distance} = \text{Number of Rounds} \times \text{Perimeter}$$

In this case:

$$\text{Total Distance} = 4 \times \text{Perimeter}$$

Step-by-Step Calculation

Suppose the length of the park is L meters and the breadth is B meters.

Step 1: Calculate the perimeter:

$$P = 2 \times (L + B)$$

Step 2: Multiply the perimeter by 4:

$$\text{Total Distance} = 4 \times P = 4 \times 2 \times (L + B) = 8 \times (L + B)$$

Example:

Let's consider a specific example to clarify the calculation:

- Length (L) = 50 meters
- Breadth (B) = 30 meters

Then:

$$P = 2 \times (50 + 30) = 2 \times 80 = 160 \text{ meters}$$

Total distance after 4 rounds:

$$= 4 \times 160 = 640 \text{ meters}$$

Thus, Rubina would have traveled 640 meters after completing 4 rounds.

Factors Affecting the Calculation

While the basic formula is straightforward, several factors can influence the actual distance calculations in real-world scenarios:

1. Path Deviation

- In practice, people may not walk exactly along the boundary, especially if there are obstacles or preferred shortcuts.
- The calculation assumes a perfect rectangle and a path along the perimeter.

2. Uneven Terrain

- If the park has uneven terrain or slopes, the actual distance traveled might be longer than the perimeter.

3. Variations in Walking Pattern

- Some individuals may walk along internal paths or take detours, affecting total distance.

Applications of the Calculation

Understanding how to find the distance traveled around a rectangular park has several practical applications:

- Fitness Tracking: Estimating total walking or running distance
- Event Planning: Calculating the amount of materials needed for fencing or decoration
- Urban Planning: Designing parks and pathways
- Navigation: Planning routes around enclosed areas

Pros and Cons of the Approach

Pros:

- Simple and easy to understand
- Requires only basic arithmetic and geometric knowledge
- Applicable to various real-life scenarios
- Provides an exact measurement if dimensions are known

Cons:

- Assumes a perfect rectangular shape
- Does not account for obstacles or deviations
- Assumes walking along the boundary without shortcuts
- Limited to static, known dimensions

Advanced Considerations

For more complex situations, advanced calculations may be necessary:

- If the park has irregular shapes, more advanced geometric methods or GIS tools might be required.
- For curved boundaries, the perimeter involves integrating over the curve, which is beyond the scope of simple formulas.
- In real-world applications, GPS data can be used to measure actual traveled distances.

Conclusion

Calculating the distance traveled by Rubina after four rounds around a rectangular park is a fundamental problem that exemplifies the practical use of geometry in everyday life. By

understanding the perimeter of a rectangle and applying basic multiplication, one can quickly determine the total distance covered. While the basic formula provides an accurate estimate in ideal conditions, real-world factors like terrain, obstacles, and walking patterns can influence the actual distance. Mastering this concept not only enhances mathematical skills but also empowers individuals to approach various practical problems involving measurements and navigation confidently.

In summary, the key steps are:

1. Calculate the perimeter of the rectangular park.
2. Multiply the perimeter by the number of rounds.
3. Use the resulting figure to understand the total distance traveled.

Whether for fitness, planning, or educational purposes, knowing how to find the distance traveled around a rectangular area is a valuable and applicable skill.

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