

1.) Write A Word Problem That Can Be Described By The Division Expression $3 \div \frac{1}{4}$. 2.) Solve

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Understanding how to translate real-world scenarios into mathematical expressions is a fundamental skill in mathematics, especially when dealing with division problems involving fractions. The division expression $3 \div \frac{1}{4}$ might seem complex at first glance, but with a clear approach, it becomes straightforward to interpret and solve. In this article, we will explore how to craft a word problem that corresponds to this division, then walk through the step-by-step solution, ensuring clarity and comprehension.

Creating a Word Problem for the Expression $3 \div \frac{1}{4}$

Understanding the Division of Whole Numbers by Fractions

Before diving into the specific problem, it's important to understand what dividing by a fraction entails. When dividing a number by a fraction, you're essentially asking, "How many times does this fraction fit into the number?" For example, $3 \div \frac{1}{4}$ asks, "How many $\frac{1}{4}$ units are there in 3 units?"

Mathematically, dividing by a fraction can be turned into multiplication by its reciprocal:

$$\frac{3}{\frac{1}{4}} = 3 \times 4$$

This calculation simplifies to 12, indicating that $\frac{1}{4}$ fits into 3 exactly 12 times.

Developing a Real-World Scenario

To create an engaging word problem, consider contexts where dividing by fractions makes sense. Some common contexts include measuring, sharing, or comparing quantities. Here's an example:

Word Problem:

"Emma has 3 meters of ribbon. She wants to cut this ribbon into pieces, each measuring $\frac{1}{4}$ meter. How many such pieces can Emma cut from her 3 meters of ribbon?"

In this scenario, the total length of ribbon (3 meters) is being divided into smaller segments of $\frac{1}{4}$ meter each. The question asks: How many $\frac{1}{4}$ -meter pieces can be obtained from 3 meters?

This problem directly corresponds to the division expression $3 \div \frac{1}{4}$.

Solving the Word Problem Step by Step

Step 1: Understand the question

The question asks for the number of $\frac{1}{4}$ -meter pieces that can be cut from 3 meters of ribbon.

Step 2: Express the problem mathematically

This is a division problem:

$$\text{Number of pieces} = 3 \div \frac{1}{4}$$

which matches the division expression $3 \div \frac{1}{4}$.

Step 3: Convert the division into multiplication

Dividing by a fraction is equivalent to multiplying by its reciprocal:

$$3 \div \frac{1}{4} = 3 \times 4$$

because the reciprocal of $\frac{1}{4}$ is 4.

Step 4: Calculate the result

$$3 \times 4 = 12$$

This means Emma can cut 12 pieces of $\frac{1}{4}$ meter each from her 3 meters of ribbon.

Step 5: Interpret the result

Emma can get 12 pieces, each measuring $\frac{1}{4}$ meter, from her 3 meters of ribbon.

Additional Examples and Contexts

Understanding this division problem can be applied to various real-world situations. Here are some examples:

- **Sharing candies:** If you have 3 pounds of candies and each bag holds $\frac{1}{4}$ pound, how many bags can you fill?
- **Cooking measurements:** If a recipe calls for 3 cups of flour, and you want to use $\frac{1}{4}$ cup scoops, how many scoops do you need?
- **Travel distances:** If a car consumes fuel at a rate of $\frac{1}{4}$ gallon per mile, how many miles can it travel with 3 gallons of fuel?

Each of these scenarios involves dividing a total quantity by a fractional measurement, illustrating the versatility of understanding division involving fractions.

Alternative Methods to Solve Division by Fractions

While multiplying by the reciprocal is the most straightforward method, some learners prefer alternative approaches.

Method 1: Cross-Multiplication

For the problem $3 \div \frac{1}{4}$:

$$\begin{aligned} \backslash \\ \text{Number of pieces} &= \frac{3}{\frac{1}{4}} = \frac{3 \times 4}{1} = 12 \\ \backslash \end{aligned}$$

This method emphasizes understanding that dividing by a fraction is multiplying by its reciprocal.

Method 2: Visual Models

Using visual models like fraction bars or area models can help conceptualize the division. For instance, representing 3 meters with a bar and dividing it into sections of $\frac{1}{4}$ meter each visually confirms that there are 12 sections.

Conclusion and Key Takeaways

Translating a division expression like $3 \div \frac{1}{4}$ into a word problem helps students and learners see the real-world relevance of fractions and division. The key points include:

- Dividing by a fraction asks how many times the fraction fits into the whole quantity.
- Converting division by a fraction into multiplication by its reciprocal simplifies the calculation.
- Word problems involving division by fractions can be framed in contexts like measuring, sharing, or traveling.
- Visual models and reciprocal multiplication are effective strategies for understanding and solving these problems.

By mastering these concepts, learners can confidently tackle various division problems involving fractions, strengthen their understanding of proportional reasoning, and apply their skills to everyday situations.

Summary:

The word problem involving 3 meters of ribbon divided into $\frac{1}{4}$ meter pieces provides a clear, relatable context for the division expression $3 \div \frac{1}{4}$. The solution demonstrates that the number of pieces Emma can get is 12, achieved by multiplying 3 by 4, the reciprocal of $\frac{1}{4}$. This approach reinforces the fundamental rule in dividing by fractions and illustrates its practical applications.

Remember: Whenever you encounter division involving fractions, think about what the problem is asking — how many units of the fractional measurement fit into the total quantity. Practice with different contexts to build a strong understanding of these essential mathematical concepts!

Frequently Asked Questions

A chef has 3 liters of sauce and wants to divide it equally into containers that each hold $\frac{1}{4}$ liter. How many containers can he fill?

He can fill 12 containers because 3 divided by $\frac{1}{4}$ equals 12.

A teacher has 3 packs of pencils, each pack containing $\frac{1}{4}$ of a dozen pencils. How many pencils does she have in total?

She has 3 divided by $\frac{1}{4}$, which equals 12 pencils in total.

A farmer has 3 gallons of water and wants to fill $\frac{1}{4}$ -gallon bottles. How many bottles can he fill?

He can fill 12 bottles because 3 divided by $\frac{1}{4}$ equals 12.

A factory produces 3 kilograms of a chemical, and each batch uses $\frac{1}{4}$ kilogram. How many batches can be made?

They can make 12 batches since 3 divided by $\frac{1}{4}$ equals 12.

If you have 3 meters of fabric and each dress requires $\frac{1}{4}$ meter, how many dresses can you make?

You can make 12 dresses because 3 divided by $\frac{1}{4}$ equals 12.

A student has 3 candies and wants to share them equally among $\frac{1}{4}$ of a class (considering a quarter of the class). How many candies does each quarter of the class receive?

Each quarter receives 12 candies because 3 divided by $\frac{1}{4}$ equals 12.

Additional Resources

1.) Write A Word Problem That Can Be Described By The Division Expression 3 Divided By $\frac{1}{4}$. 2.) Solve

Introduction

Mathematics often finds its way into our daily lives through practical problems that require critical thinking and basic arithmetic skills. Among the foundational operations, division plays a crucial role, especially when translating real-world scenarios into mathematical expressions. In this article, we will explore how to craft a relatable word problem that corresponds to the division expression $3 \div \frac{1}{4}$, and then demonstrate the step-by-step process to solve it. By doing so, we aim to make the abstract concept of division more tangible and accessible for learners and enthusiasts alike.

Developing a Word Problem for $3 \div \frac{1}{4}$

Creating an effective word problem starts with identifying a scenario that naturally involves dividing a quantity into parts or determining how many groups are formed. The key here is understanding what dividing by a fraction entails. When dividing by a fraction, you're essentially asking how many times that fraction fits into the given number.

Understanding the Expression:

- The division expression $3 \div \frac{1}{4}$ asks: How many quarter units are there in 3?

This can be interpreted in various real-world contexts. Let's explore some potential scenarios.

Possible Contexts for the Word Problem:

1. Pie Slices Scenario:

- Suppose you have 3 whole pies, and each pie is cut into 4 equal slices. How many slices do you have in total?

2. Packaging and Quantity Scenario:

- Imagine a factory produces 3 liters of a liquid. If each package contains $\frac{1}{4}$ liter, how many packages can be filled with this amount?

3. Time and Work Scenario:

- A worker completes 3 units of work, and each unit takes $\frac{1}{4}$ hour. How many hours did the worker spend to complete all 3 units?

While all these scenarios are valid, the most straightforward and relatable is the first: slicing pies, as it visually demonstrates dividing by a fraction.

Chosen Word Problem:

"You have 3 whole pies, and each pie is cut into 4 equal slices. How many slices are there in total?"

This problem directly maps to the division expression $3 \div \frac{1}{4}$, because it considers how many quarter slices fit into 3 pies.

Breaking Down the Word Problem

Let's analyze the problem:

- Total pies: 3
- Each pie is sliced into: 4 equal slices
- Question: Total number of slices across all pies

Mathematically:

- Total slices = Number of pies $\times$ Slices per pie

Alternatively, considering the division:

- Total slices = 3 (pies) $\div$ $(\frac{1}{4})$ (slice size in pies)

This is because:

- One slice is $\frac{1}{4}$ of a pie
- The total number of slices in 3 pies is how many $\frac{1}{4}$ slices fit into 3 pies

How to Solve $3 \div \frac{1}{4}$

Now, let's delve into the solution process. Understanding division involving fractions is pivotal in tackling such problems.

Step 1: Recognize the division of a whole by a fraction

When dividing by a fraction, the operation can be transformed into multiplication by its reciprocal:

$$\backslash \\ a \div b = a \times \frac{1}{b} \\ \backslash$$

Applying this rule:

$$\backslash \\ 3 \div \frac{1}{4} = 3 \times 4 \\ \backslash$$

Because the reciprocal of $(\frac{1}{4})$ is 4.

Step 2: Perform the multiplication

$$\backslash \\ 3 \times 4 = 12$$

\]

This indicates that there are 12 slices in total.

Interpreting the Result

The calculation confirms that:

- Total slices = 12

This aligns with the initial scenario: each of the 3 pies cut into 4 slices yields $(3 \times 4 = 12)$ slices.

Visual Representation

Imagine three pies, each sliced into four pieces:

- Pie 1: 4 slices
- Pie 2: 4 slices
- Pie 3: 4 slices

Total slices:

$$\begin{aligned} & \backslash \\ & 4 + 4 + 4 = 12 \\ & \backslash \end{aligned}$$

This visual reinforces the mathematical solution.

Broader Applications and Conceptual Understanding

Understanding division by fractions is a powerful skill with broad applications, from cooking measurements to planning resources. The key takeaway from this problem is that dividing by a fraction is equivalent to multiplying by its reciprocal.

Summary of Concepts:

- Division by a fraction: $(a \div \frac{b}{c} = a \times \frac{c}{b})$
- Reciprocal of a fraction: flipping numerator and denominator
- Multiplication approach simplifies complex division problems involving fractions

Additional Examples for Practice

To deepen understanding, consider these variations:

1. Scenario: You have 5 liters of juice, and each cup holds $\frac{1}{2}$ liter. How many cups can you fill?

- Solution: $(5 \div \frac{1}{2} = 5 \times 2 = 10)$ cups

2. Scenario: You walk 2 miles, and each step covers $\frac{1}{4}$ mile. How many steps did you take?

- Solution: $(2 \div \frac{1}{4} = 2 \times 4 = 8)$ steps

3. Scenario: You have \$8, and each item costs $\frac{1}{4}$. How many items can you buy?

- Solution: $(8 \div \frac{1}{4} = 8 \times 4 = 32)$ items

Conclusion

Transforming a real-world problem into a mathematical expression is a critical skill that bridges abstract concepts with tangible scenarios. The division expression $3 \div \frac{1}{4}$ exemplifies how dividing by a fraction corresponds to multiplying by its reciprocal, simplifying seemingly complex problems. By understanding this principle, learners can confidently approach a range of problems—from slicing pies to resource allocation—making mathematics both practical and engaging.

The word problem about slicing pies not only illustrates the division operation but also provides a visual and intuitive grasp of how fractions work in everyday life. Whether in cooking, shopping, or planning, recognizing the relationship between division and multiplication by reciprocals enhances problem-solving skills and mathematical literacy.

In essence, mastering division with fractions equips you with a versatile toolset for numerous real-world applications, making math both meaningful and accessible.

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