

Refer To The Diagram. $75 + (5x)$ Write An Equation That Can Be Used To Find The Value Of x .

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Understanding how to formulate equations from diagrams is a fundamental skill in mathematics, particularly in algebra. When you are presented with a diagram that includes algebraic expressions like $75 + (5x)$, your goal is to interpret the diagram correctly and translate the visual information into a mathematical equation. This process not only enhances your problem-solving skills but also deepens your understanding of algebraic concepts such as variables, expressions, and equations. In this article, we will explore how to interpret diagrams, construct appropriate equations, and solve for the unknown variable x , using the example of the expression $75 + (5x)$.

Understanding the Significance of the Diagram

Before we write an equation, it's crucial to analyze what the diagram illustrates. Diagrams in mathematics often serve as visual representations of algebraic relationships, helping to clarify the problem's context.

Types of Diagrams Commonly Used

- Number Line Diagrams: Show quantities and their relationships along a line.
- Bar Models: Visualize parts of a whole, often used in fractions or parts-of-a-whole problems.
- Geometric Figures: Such as triangles or rectangles, indicating relationships like angles or areas.
- Arithmetic or Algebraic Visuals: Including expressions or sums, sometimes with variables.

In our case, the diagram likely involves an arrangement or a visual that includes the expression $75 + (5x)$. Although the exact visual isn't provided here, typical scenarios include:

- A number line illustrating the sum.
- A bar model partitioned into sections representing the sum.
- A word problem context where 75 and $5x$ are parts of a total or compared quantities.

Understanding the diagram's context allows you to correctly set up the equation.

Interpreting the Expression $75 + (5x)$

The expression $75 + (5x)$ combines a constant (75) with a variable term ($5x$).

Breaking Down the Expression

- 75: A fixed value, possibly representing a known quantity.
- $5x$: A variable term, indicating a quantity that depends on the value of x .

In problems, this expression can represent a total amount, a combined quantity, or a sum of parts. For example:

- If the diagram shows a total sum, then $75 + 5x$ could be the total.
- If it depicts parts of a whole, then 75 might be one part, and $5x$ another.

Writing the Equation from the Diagram

Transforming the visual information into a mathematical equation involves identifying what the diagram equates or compares. Typically, this involves setting the expression equal to a known value or another expression.

Steps to Write the Equation

1. **Identify the total or known value:** Look for a label or a total sum in the diagram.
2. **Determine the parts:** Recognize what 75 and $5x$ represent in the diagram.
3. **Translate the visual into an equation:** Equate the sum or parts to the total or the other side of the problem.
4. **Include the variable:** Ensure that x remains as the unknown to be solved.

Example: Suppose the diagram shows a total quantity of 125, with 75 units in one part and the remaining being 5 times some unknown x . We can write:

$[75 + 5x = 125]$

This equation reflects the sum of the parts shown in the diagram equal to the total.

Formulating the Specific Equation Based on the

Diagram

Given the general expression $75 + (5x)$, and assuming the total or the sum indicated by the diagram is a known value, the specific equation becomes:

$$75 + 5x = \text{Total Value}$$

where "Total Value" is a number provided in the diagram or problem statement.

Sample Scenario:

The diagram illustrates that the sum of a fixed amount (75) and an unknown multiple ($5x$) equals 125.

Equation:

$$75 + 5x = 125$$

Solving the Equation for X

Once the equation is established, the next step involves solving for x to find its value.

Step-by-Step Solution

1. **Subtract 75 from both sides:**

$$75 + 5x = 125 \implies 5x = 125 - 75$$
$$5x = 50$$

2. **Divide both sides by 5:**

$$x = \frac{50}{5}$$
$$x = 10$$

Result: The value of x is 10.

Interpreting the Solution

Understanding what x represents in the context of the diagram is vital. For example:

- If the diagram relates to quantities, then x might signify the number of units in a certain group.
- If it involves distances, x could represent a length or measurement.
- In a word problem, x might correspond to an unknown number of items, hours, or other quantities.

Correct interpretation hinges on the initial diagram, the labels provided,

and the context.

Additional Examples and Practice Problems

To solidify understanding, consider various scenarios where you can apply this approach.

Example 1: Total Cost Problem

- Diagram shows a total cost of \$200, with a fixed fee of \$75 plus a variable fee of \$5x.
- Write the equation and solve for x.

Solution:

```
\[ 75 + 5x = 200 \]
\[ 5x = 200 - 75 = 125 \]
\[ x = \frac{125}{5} = 25 \]
```

Interpretation: The variable quantity x equals 25, which could represent hours, items, or units depending on context.

Example 2: Distance or Length Problem

- A diagram depicts a total length of 150 meters, composed of 75 meters plus an unknown multiple 5x meters.
- Write and solve the equation.

Solution:

```
\[ 75 + 5x = 150 \]
\[ 5x = 150 - 75 = 75 \]
\[ x = \frac{75}{5} = 15 \]
```

Interpretation: The value of x is 15, which might indicate additional length segments.

Tips for Effective Equation Writing from Diagrams

- Always identify the total or known quantities from the diagram.
- Determine what each part of the diagram represents and how they relate.
- Translate visual relationships into algebraic expressions carefully.
- Check the units and context to ensure your equation makes sense.
- Verify your solution by substituting x back into the original expression or diagram.

Conclusion

Transforming diagrams into algebraic equations is a crucial skill that bridges visual understanding and mathematical formalism. When faced with an expression like $75 + (5x)$, the key steps involve analyzing the diagram, identifying the total or known quantities, and translating the visual parts into an equation. Once the equation is written, solving for x becomes straightforward through basic algebraic operations. Mastery of this process enhances problem-solving abilities and builds a solid foundation for more advanced mathematical concepts. Remember to always interpret the diagram carefully, verify your equation, and contextualize your solution to ensure a comprehensive understanding of the problem at hand.

Frequently Asked Questions

What does the expression $75 + (5x)$ represent in the diagram?

It represents a linear expression where 75 is a constant, and $5x$ is a term that depends on the variable x , likely indicating a total or combined value shown in the diagram.

How do you set up an equation from the diagram using $75 + (5x)$?

You identify what the expression represents in the diagram (such as a total or sum) and set it equal to the known value, forming an equation like $75 + 5x = \text{total value}$.

What is the first step to solve for x in the equation $75 + 5x = \text{total value}$?

Subtract 75 from both sides of the equation to isolate the term with x , resulting in $5x = \text{total value} - 75$.

If the total value in the diagram is 125, what is the equation to find x ?

The equation would be $75 + 5x = 125$.

How can I find the value of x once I have the equation $75 + 5x = 125$?

Subtract 75 from both sides to get $5x = 50$, then divide both sides by 5 to find $x = 10$.

Why is it important to write an equation based on the diagram rather than just guessing?

Writing an equation ensures a precise and systematic approach to solving for

x, based on the information presented in the diagram, reducing errors.

Can this method be used for diagrams with different total values? How?

Yes, the method applies generally: set up the expression from the diagram equal to the total value, then solve for x accordingly.

Additional Resources

Refer To The Diagram. $75 + (5x)$ Write An Equation That Can Be Used To Find The Value Of X.

In the realm of mathematics, problem-solving often involves translating visual information into algebraic expressions. The phrase "Refer to the diagram. $75 + (5x)$ " suggests a scenario where visual cues—such as geometric figures, number lines, or other graphical representations—are integral to understanding the problem. The challenge lies in constructing a clear, accurate equation that captures the relationship depicted, enabling us to solve for the unknown variable, x. This article aims to guide readers through the process of interpreting such problems, developing the corresponding equations, and ultimately finding the value of x with confidence.

Understanding the Context: The Importance of Visuals in Math Problems

Mathematics heavily relies on visual aids to enhance comprehension. Diagrams serve as powerful tools that translate abstract concepts into tangible images, facilitating problem-solving. When a problem references a diagram—such as "Refer to the diagram. $75 + (5x)$ "—it implies that the visual provides key information about the relationships between quantities involved.

Why are diagrams important?

- Clarify Relationships: They show how different quantities are connected, such as parts of a figure, distances, or angles.
- Highlight Known and Unknown Values: Visuals often label known quantities (like 75) and variables (like x), making it easier to formulate equations.
- Aid in Conceptual Understanding: They help in visualizing the problem, especially in geometry, measurement, or algebraic contexts.

In our case, the phrase suggests a scenario where a numerical value (75), combined with an expression involving x ($5x$), is relevant to the diagram. To accurately write an equation, understanding what the diagram illustrates is essential—whether it depicts a geometric figure, a number line, or a word problem.

Deciphering the Phrase: Breaking Down " $75 + (5x)$ "

Before constructing an equation, it's vital to interpret the phrase " $75 + (5x)$ " in context. This phrase can represent different situations, such as:

- A total amount that combines a fixed number (75) with a variable component proportional to x (5 times x).

- A segment or part of a geometric figure, for instance, the sum of a known length (75 units) and an unknown segment (5x).
- An algebraic expression describing a total quantity, such as total cost, distance, or measurement, depending on the diagram.

Key observations:

- The number 75 is a fixed, known quantity.
- The term 5x indicates a quantity that depends on the value of x, scaled by 5.
- The context probably involves setting this sum equal to another value, which will allow solving for x.

Therefore, to write an equation, we need to identify what the total sum (75 + 5x) equates to—this could be given in the diagram or stated explicitly in the problem. Common forms include:

- $75 + 5x = \text{some total}$
- $75 + 5x > \text{or} < \text{some value}$
- $75 + 5x = \text{a specific number in the diagram}$

Constructing the Equation: Step-by-Step Approach

Creating an algebraic equation from a visual problem involves several systematic steps:

Step 1: Identify Known and Unknown Quantities

- Known quantities: Any numbers explicitly given in the diagram (e.g., 75), labels, or measurements.
- Unknown quantities: Typically represented by variables such as x.

Step 2: Understand the Relationship

Examine the diagram to determine how the parts relate:

- Are the parts additive? Does the diagram show segments or areas that sum up?
- Is the 75 a fixed value (like a length, cost, or quantity)?
- Does the diagram suggest that 75 plus 5 times x equals another number or total?

Step 3: Formulate the Equation

Based on the observed relationships, write an equation:

- For example, if the total represented in the diagram equals a certain value T, then:

$$75 + 5x = T$$

- If the total is not explicitly given, the problem may involve setting it equal to a known total to solve for x.

Practical Example: Applying the Concept

Suppose the diagram depicts a scenario where a total length is composed of a fixed segment of 75 units plus an additional segment that depends on x , scaled by 5. The total length is provided as 125 units in the diagram.

Step-by-step:

- Known: Fixed segment = 75 units
- Variable: Additional segment = $5x$ units
- Total length: 125 units

Constructing the equation:

$$75 + (5x) = 125$$

This equation models the situation accurately, allowing us to solve for x .

Solving for x :

1. Subtract 75 from both sides:

$$5x = 125 - 75$$

2. Simplify:

$$5x = 50$$

3. Divide both sides by 5:

$$x = 50 / 5$$

4. Final value:

$$x = 10$$

This example illustrates how visual cues in the diagram guide the formulation of the algebraic equation.

Generalizing the Approach: Different Types of Problems

The method for writing equations from diagrams extends beyond straightforward addition. Here are some common scenarios:

1. Linear Relationships

- Diagram shows parts that combine to form a total.
- Equation form: sum of parts = total.
- Example: "A rectangle's length is 75 units plus 5 times x , and its width is x units. Find the perimeter if the perimeter is 200 units."

Equation:

$$(2 \times \text{length}) + (2 \times \text{width}) = \text{perimeter}$$

Substitute:

$$2(75 + 5x) + 2(x) = 200$$

Solve for x .

2. Proportional Relationships

- Diagram illustrates ratios or scaled figures.
- Equation form: cross-multiplied ratios or proportional equations.

3. Geometric Situations

- Diagram shows segments, angles, or areas involving variables.
- Equations are derived from geometric formulas, such as the Pythagorean theorem or area formulas.

Tips for Accurate Equation Formation

- Carefully examine the diagram: Look for labels, measurements, and relationships.
- Identify what each part represents: Know what the constants and variables stand for.
- Translate visually into algebra: Convert the relationships into expressions step-by-step.
- Verify the equation: Cross-check with the diagram to ensure consistency.

Final Thoughts: The Power of Visuals in Mathematics

The phrase "Refer to the diagram. $75 + (5x)$ " encapsulates the essence of translating visual information into algebraic form—a fundamental skill in mathematics. Whether dealing with geometry, measurement, or algebraic word problems, the ability to interpret diagrams and craft corresponding equations is invaluable.

By systematically analyzing known and unknown quantities, understanding their relationships, and translating these into algebraic expressions, students and professionals alike can unlock solutions efficiently. The example provided demonstrates the importance of context and visual cues in problem-solving, emphasizing that mathematics is as much about understanding the scenario as it is about manipulating symbols.

In conclusion, whenever faced with a diagram and an expression like " $75 + (5x)$," approach the problem methodically: scrutinize the visual, identify relationships, formulate the equation, and solve. Doing so not only yields the correct value of x but also deepens your overall comprehension of how visual and algebraic reasoning intertwine—a skill that is essential across all branches of mathematics and applied sciences.

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