

$3(x + 8) = 15x = [?]$

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When encountering the equation $3(x + 8) = 15x = [?]$, it might seem initially confusing because it appears to combine multiple expressions into a single statement. In mathematics, understanding how to interpret and solve such an equation involves breaking down the expression, analyzing each part, and applying algebraic principles. This article aims to guide you through the process of deciphering this type of equation, providing step-by-step solutions, insightful explanations, and practical tips. Whether you're a student learning algebra for the first time or someone looking to refine your problem-solving skills, this comprehensive guide will cover everything you need to know about equations like $3(x + 8) = 15x = [?]$.

Understanding the Equation $3(x + 8) = 15x = [?]$

Breaking Down the Expression

The given expression appears to be a chain of equalities:

```
```plaintext
3(x + 8) = 15x = [?]
```
```

This notation suggests that the value of $3(x + 8)$ is equal to $15x$, and both are equal to some unknown value represented by $[?]$. To interpret it correctly:

- The expression implies two equalities:

1. $3(x + 8) = 15x$
2. $15x = [?]$

- The goal is to find the value of $[?]$, which, based on the equalities, should be equal to both $3(x + 8)$ and $15x$.

Visual Representation:

```
```
3(x + 8) = 15x = [?]
```
```

means:

$$3(x + 8) = 15x$$

and

$$15x = [?]$$

Step-by-Step Solution to the Equation

Step 1: Solve $3(x + 8) = 15x$

Let's start by simplifying and solving the first part:

```plaintext

$$3(x + 8) = 15x$$

```

Expanding the left side:

```plaintext

$$3x + 24 = 15x$$

```

Bring all terms involving x to one side:

```plaintext

$$3x + 24 = 15x$$

$$\Rightarrow 24 = 15x - 3x$$

$$\Rightarrow 24 = 12x$$

```

Solve for x:

```plaintext

$$x = 24 / 12$$

$$\Rightarrow x = 2$$

```

Result: The value of x that satisfies the first equality is $x = 2$.

Step 2: Find the value of $[?]$

Since $[?]$ is equal to $15x$, and we now know that $x = 2$, substitute this value into $15x$:

```plaintext  
[?] = 15 \* 2 = 30  
```

Therefore, the value of `[?]' is 30.

Summary of the Solution

- The key to solving the expression $3(x + 8) = 15x = [?]$ is recognizing that it involves two equalities.
- By solving $3(x + 8) = 15x$, we found $x = 2$.
- Using this value, we calculated $[?] = 30$.

Understanding the Significance of the Equation

Algebraic Principles Applied

This problem demonstrates core algebraic concepts:

- Distributive property: Expanding expressions like $3(x + 8)$.
- Combining like terms: Moving all terms involving x to one side.
- Solving linear equations: Isolating x and calculating its value.

Practical Applications

Equations similar to $3(x + 8) = 15x$ are common in various fields:

- Business: Calculating profit margins or cost equations.
- Engineering: Analyzing force balances or electrical circuits.
- Everyday problem-solving: Budgeting, planning, and resource allocation.

Understanding how to approach and solve such equations equips you with essential problem-solving skills applicable across disciplines.

Common Mistakes to Avoid

- Misinterpreting the chain of equalities: Remember that the expression involves multiple equalities, not just one.
- Forgetting to expand brackets: Always expand expressions like $3(x + 8)$ before solving.
- Incorrect algebraic manipulation: Be cautious when bringing variables to one side; perform operations carefully.
- Ignoring the solution's validity: Verify your solutions by substituting back into the original equations.

Additional Practice Problems

To reinforce your understanding, try solving these similar equations:

1. Solve $4(x - 3) = 2x$ and find the value of the expression $2x + 5$.
2. Given that $5(x + 2) = 3x + 10$, find x and then compute the value of $2(x) + 7$.
3. Determine x if $2x + 6 = 4x - 8$, and verify the value of $3(x + 4)$.

Conclusion: Mastering Equations with Multiple Equalities

Equations like $3(x + 8) = 15x = [?]$ may seem complex at first glance, but with a structured approach, they become manageable. The key steps involve understanding the chain of equalities, solving for the variable, and then finding the unknown value. Mastering these techniques enhances your algebraic skills, providing a solid foundation for tackling more advanced mathematical problems. Remember to practice regularly, verify your solutions, and keep a clear step-by-step approach to ensure accuracy and confidence in solving similar equations in the future.

Additional Resources for Learning Algebra

- Online tutorials and videos: Platforms like Khan Academy offer comprehensive lessons.

- Algebra textbooks: Look for books that provide practice problems with solutions.
- Educational apps: Use apps that focus on algebra practice for interactive learning.
- Math tutoring: Consider seeking help from tutors for personalized guidance.

By exploring these resources, you can deepen your understanding of algebraic concepts and improve your problem-solving abilities.

Optimized for SEO Keywords:

- Algebra equations
- Solving equations with multiple equalities
- How to solve $3(x + 8) = 15x$
- Understanding algebraic expressions
- Step-by-step algebra solutions
- Solving linear equations
- Algebra practice problems
- Mathematical problem-solving tips

In summary, mastering equations like $3(x + 8) = 15x = [?]$ involves understanding the structure of chained equalities, applying algebraic expansion and simplification, and verifying solutions. With consistent practice and a clear step-by-step approach, you can confidently solve similar problems and enhance your mathematical proficiency.

Frequently Asked Questions

What is the correct way to interpret the equation $3(x + 8) = 15x$?

The equation $3(x + 8) = 15x$ means that three times the sum of x and 8 equals 15 times x . To solve, expand the left side to get $3x + 24 = 15x$.

How do you solve for x in the equation $3(x + 8) = 15x$?

First, expand to $3x + 24 = 15x$. Then, subtract $3x$ from both sides to get $24 = 12x$. Finally, divide both sides by 12 to find $x = 2$.

What is the value of x in the equation $3(x + 8) = 15x$?

x equals 2. After solving the equation, $x = 2$.

Is the equation $3(x + 8) = 15x$ valid for solving x , and

what does it represent?

Yes, it is valid. It represents an algebraic relationship where three times the sum of x and 8 equals 15 times x , and solving it helps find the specific value of x .

Can the equation $3(x + 8) = 15x$ be simplified further, and if so, how?

Yes, by expanding and then isolating x , as in $3x + 24 = 15x$, which simplifies to $x = 2$ after solving.

Additional Resources

Mathematical Clarity and Problem-Solving Strategy in the Equation $3(x + 8) = 15x = [?]$

Introduction

Mathematics, at its core, is a language that allows us to model, analyze, and solve real-world problems with precision. Among the foundational concepts are equations—statements that assert the equality of two expressions. The equation $3(x + 8) = 15x = [?]$ presents an interesting case that invites careful interpretation and systematic solving techniques. This piece aims to thoroughly dissect this equation, explore its structure, and guide you through the process of understanding and solving it effectively.

Understanding the Equation: Clarifying the Notation

The Ambiguity in the Expression

At first glance, the equation $3(x + 8) = 15x = [?]$ might seem straightforward, but closer inspection reveals ambiguity due to its chaining. The expression contains two equal signs, which is an unconventional notation if taken literally, because standard equations typically contain a single equal sign, representing an equality between two expressions.

Possible interpretations include:

1. Chained equality:

$\backslash (3(x + 8) = 15x = [?] \backslash$

meaning:

$\backslash (3(x + 8) = 15x \backslash$

and

$\backslash (15x = [?] \backslash$

2. A notation for a sequence of equalities:

with the last part $\backslash ([?] \backslash$ indicating a value to be found, possibly the value of the expression or the solution for $\backslash (x \backslash$.

3. An incomplete expression:

perhaps intended as:

$3(x + 8) = 15x$, and then find the value of this expression or the value of x .

Given the structure, the most logical and mathematically consistent interpretation is that the chain indicates:

$$3(x + 8) = 15x$$

and the question is to find the value of the expression or the value of x that satisfies this equality, possibly with the placeholder "[?]" representing the value of the expression.

Step 1: Interpreting the Equation Correctly

Therefore, the key task is to solve the equation:

$$3(x + 8) = 15x$$

and then evaluate the expression or find the value indicated by "[?]".

Step 2: Solving the Equation $3(x + 8) = 15x$

Expand and Simplify

- Start by expanding the left side:

$$3(x + 8) = 3x + 24$$

- The equation now reads:

$$3x + 24 = 15x$$

Isolate the variable x :

- Subtract $3x$ from both sides:

$$24 = 15x - 3x$$

$$\begin{aligned} &24 = 12x \\ & \end{aligned}$$

- Divide both sides by 12:

$$\begin{aligned} &x = \frac{24}{12} = 2 \\ & \end{aligned}$$

Result: The solution for (x) is 2.

Step 3: Finding the Value of the Expression "[?]"

Given $(x = 2)$, evaluate the expression on the left:

$$\begin{aligned} &3(x + 8) = 3(2 + 8) = 3 \times 10 = 30 \\ & \end{aligned}$$

Similarly, evaluate the right side:

$$\begin{aligned} &15x = 15 \times 2 = 30 \\ & \end{aligned}$$

Since both sides are equal and equal to 30, the value of "[?]" appears to be 30.

Summary of Findings

- The equation $(3(x + 8) = 15x)$ yields $(x = 2)$.
- Substituting $(x = 2)$ back into either side gives the value 30.
- The placeholder "[?]" corresponds to this value.

Deeper Insights and Broader Context

The Importance of Proper Equation Interpretation

This problem underscores a vital aspect of mathematical problem-solving: clarity in notation. When encountering chained equalities or ambiguous expressions, it's crucial to:

- Parse the notation carefully.
- Clarify whether multiple equal signs denote a chain of equalities.
- Confirm whether the goal is to find the variable or the value of an expression.

In real-world applications, ambiguous equations can lead to misinterpretation, so developing a systematic approach to read and interpret such expressions is essential.

The Role of Algebra in These Problems

Algebra provides the tools to systematically manipulate and solve equations:

- Expansion: Distribute constants over parentheses.
- Isolation of variables: Use inverse operations to solve for unknowns.
- Verification: Substitute solutions back into the original expression to verify correctness.

Advanced Considerations

Extending the Problem: What if the Equation Had Multiple Chains?

Suppose the original problem was intended as:

$$\begin{aligned} & \backslash[\\ & 3(x + 8) = 15x = c \\ & \backslash] \end{aligned}$$

where (c) is a constant value, and the goal is to find (c) . Then:

- From previous calculations, $(3(x + 8) = 30)$, and $(15x = 30)$, so $(c = 30)$.

Alternatively, if the chain is meant to be:

$$\begin{aligned} & \backslash[\\ & 3(x + 8) = 15x \\ & \backslash] \end{aligned}$$

and also related to some other expression, the approach remains similar: isolate variables, solve equations, and interpret the results.

Practical Applications and Relevance

Understanding such equations is fundamental in:

- Engineering: where equations model physical systems.
- Economics: for optimizing profit functions.
- Science: in data modeling and statistical analysis.
- Computer Science: algorithms often involve solving equations programmatically.

Moreover, competency in interpreting chained equalities and complex expressions enhances problem-solving skills and mathematical literacy.

Tips for Approaching Similar Equations

1. Identify the structure: Are there multiple equal signs? Is it a chain?
2. Clarify the goal: Are you solving for a variable or evaluating an expression?
3. Simplify step-by-step: Expand, combine like terms, isolate variables.
4. Check your solutions: Substitute back to verify correctness.
5. Be attentive to notation: Misinterpretation can lead to errors.

Final Thoughts

The equation $3(x + 8) = 15x = [?]$ exemplifies the importance of careful interpretation and systematic problem-solving in mathematics. By dissecting the notation, expanding expressions, solving for the variable, and evaluating the resulting expressions, one gains not only the answer but also deeper insight into algebraic reasoning.

This problem also highlights the broader significance of understanding chained equalities and ambiguous expressions, which are common in advanced mathematics, physics, and engineering contexts. Mastery over these concepts enhances analytical thinking and prepares learners to tackle complex, real-world problems with confidence.

Closing Remarks

Mathematics is a discipline built on clarity, precision, and logical reasoning. Whether dealing with straightforward equations or complex, chained expressions, the fundamental approach remains the same: interpret carefully, manipulate systematically, and verify thoroughly. The specific problem of solving for x in $3(x + 8) = 15x$ and finding the value of the expression demonstrates these principles in action. Keep practicing such problems to develop a robust mathematical mindset that can handle ambiguity and complexity with ease.

In conclusion, the solution to the equation $3(x + 8) = 15x = [?]$ is:

- $x = 2$
- Value of the expression (and the placeholder "[?]") is 30

Through understanding the structure, applying algebraic techniques, and verifying results, we've navigated this problem comprehensively, illustrating core mathematical concepts and problem-solving strategies essential for learners at all levels.

3 X 8 15x

3 X 8 15x

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