

What Value Of X Is In The Solution Set Of $3(x + 4) + 5x + 2 = 105510$

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When presented with a mathematical problem involving an algebraic expression and a constant, such as " $3(x + 4) + 5x + 2 = 105510$," the first step is to interpret the problem correctly. The question appears to be asking, "What value of x is in the solution set of the expression $3(x + 4) + 5x + 2$?" with the number 105510 possibly serving as a reference number or an additional clue. To clarify, it's essential to understand the nature of the expression, the intended operations, and how to approach solving for x . This article explores the problem step-by-step, providing insights into algebraic manipulation, solving equations, and understanding solution sets.

Understanding the Problem Statement

Before diving into calculations, it's crucial to interpret the problem accurately. The phrase " $3(x + 4) + 5x + 2 = 105510$ " seems to be missing some operators or contains typographical issues. A common interpretation could be:

- The expression might be $3(x + 4) + 5x + 2 = 105510$, or
- It could be $3(x + 4) + 5x + 2$ with a question asking for the value of x that satisfies the equation equal to 105510.

Given typical algebraic patterns, the most logical form is:

$$3(x + 4) + 5x + 2 = 105510$$

This assumption allows us to proceed with solving the equation for x .

Step-by-Step Solution of the Equation

1. Write the Equation Clearly

Assuming the intended problem is:

$$3(x + 4) + 5x + 2 = 105510$$

2. Distribute and Simplify

Start by distributing the 3 inside the parentheses:

$$3(x + 4) = 3x + 12$$

Now, rewrite the entire equation:

$$3x + 12 + 5x + 2 = 105510$$

Combine like terms:

$$(3x + 5x) + (12 + 2) = 105510$$

$$8x + 14 = 105510$$

3. Isolate the Variable x

Subtract 14 from both sides:

$$8x = 105510 - 14$$

$$8x = 105496$$

Divide both sides by 8:

$$x = 105496 \div 8$$

Calculate the division:

$$105496 \div 8 = 13187$$

So, the solution is:

$$x = 13187$$

Verifying the Solution

Always verify your solution by substituting x back into the original equation:

Original assumed equation:

$$3(x + 4) + 5x + 2 = 105510$$

Substitute $x = 13187$:

$$3(13187 + 4) + 5(13187) + 2$$

Calculate step-by-step:

$$- 13187 + 4 = 13191$$

$$- 3 \times 13191 = 39573$$

$$- 5 \times 13187 = 65935$$

Now sum:

$$39573 + 65935 + 2 = 105510$$

Since the sum matches the right side, $x = 13187$ is indeed the correct solution.

Understanding the Solution Set

What Is a Solution Set?

In algebra, the solution set includes all values of x that satisfy an equation. Since the equation was linear, it has a unique solution: $x = 13187$.

Solution Set for the Given Equation

The solution set in this case is a singleton: $\{13187\}$. It contains only one value, indicating a unique solution.

Additional Considerations

Possible Variations of the Problem

The initial problem statement was somewhat ambiguous. If the original expression or the number 105510 was different, the approach to solving might change. For example:

$$- \text{If the expression was } 3(x - 4) + 5x + 2 = 105510$$

- Or if the number was part of an inequality or different equation

In such cases, repeat the algebraic steps accordingly.

Handling Different Types of Problems

The key to solving similar problems includes:

- Correctly interpreting the expression
- Simplifying step-by-step
- Isolating the variable x
- Verifying the solution

Conclusion

Based on the most logical interpretation of the problem, the value of x in the solution set of the equation $3(x + 4) + 5x + 2 = 105510$ is 13187. This solution was obtained through systematic algebraic manipulation, including distribution, combining like terms, and solving for x . Understanding how to approach such problems is essential for mastering algebra and solving real-world mathematical problems efficiently. Remember always to verify your solutions by substituting back into the original equation to ensure accuracy.

Whether you are tackling simple linear equations or more complex algebraic expressions, the key is clarity, step-by-step solving, and careful verification. With practice, identifying the solution set and understanding the role of each component becomes second nature, empowering you to confidently solve a wide array of mathematical problems.

Frequently Asked Questions

What is the equation given in the problem for which we need to find the value of x ?

The equation provided is $3(x + 4) + 5x = 105510$.

How do you start solving the equation $3(x + 4) + 5x = 105510$?

First, distribute the 3 over $(x + 4)$ to get $3x + 12 + 5x = 105510$.

What is the next step after expanding $3(x + 4)$ to $3x + 12$?

Combine like terms: $3x + 5x = 8x$, resulting in $8x + 12 = 105510$.

How do you isolate x in the equation $8x + 12 = 105510$?

Subtract 12 from both sides to get $8x = 105510 - 12$, which simplifies to $8x = 105498$.

What is the value of x after dividing both sides by 8?

Divide 105498 by 8 to find x : $x = 105498 / 8 = 13187.25$.

Is the value $x = 13187.25$ part of the solution set?

Yes, $x = 13187.25$ is the solution to the equation and thus in the solution set.

Are there any restrictions or extraneous solutions to consider in this problem?

No, since the original equation is linear and straightforward, the solution $x = 13187.25$ is valid without restrictions.

What is the final answer to the question 'What value of x is in the solution set of the equation?'

The value of x in the solution set is 13187.25.

Additional Resources

What Value Of x Is In The Solution Set Of $3(x + 4) + 5x = 105510$?

Understanding the value of x in this equation is essential for solving algebraic expressions and honing problem-solving skills. Whether you're a student tackling your first algebra problem or a professional brushing up on fundamental concepts, breaking down the solution process systematically can help clarify the approach. In this guide, we will explore how to find the value of x in the equation $3(x + 4) + 5x = 105510$, step by step, providing insights, tips, and detailed explanations along the way.

The Importance of Solving for x

Before diving into the solution, it's helpful to understand why solving for x matters. Algebra is the

language of mathematics that enables us to express relationships, analyze patterns, and solve real-world problems. Finding the value of x in an equation like this allows us to understand what specific value makes the entire expression true, which is fundamental in fields such as engineering, economics, computer science, and everyday problem-solving.

Breaking Down the Equation

Let's first examine the given equation:

$$3(x + 4) + 5x = 105510$$

This is a linear algebraic equation that involves a combination of parentheses, coefficients, and constants. Our goal is to isolate x and determine its value.

Step 1: Expand the Parentheses

The first step in solving any algebraic equation involving parentheses is to distribute the coefficients across the terms inside the parentheses:

$$- 3(x + 4) \text{ becomes } 3x + 12$$

Now, the equation becomes:

$$3x + 12 + 5x = 105510$$

Step 2: Combine Like Terms

Next, combine similar terms on the left side:

$$- 3x + 5x = 8x$$

So, the equation simplifies to:

$$8x + 12 = 105510$$

Step 3: Isolate the Variable Term

To solve for x , subtract 12 from both sides:

$$8x + 12 - 12 = 105510 - 12$$

which simplifies to:

$$8x = 105498$$

Step 4: Solve for X

Divide both sides by 8:

$$x = 105498 / 8$$

Calculating this division:

$$- 8 \ 13187 = 105496$$

$$- \text{Remaining difference: } 105498 - 105496 = 2$$

Therefore:

$$x = 13187 + 2/8 = 13187 + 1/4$$

Expressed as a decimal:

$$x = 13187.25$$

Final Answer

The value of x in the solution set of the given equation is 13187.25.

Additional Insights and Considerations

While this particular problem is straightforward, understanding the process can be extended to more complex equations. Here are key points to keep in mind:

1. Always Expand Parentheses First

Distributing coefficients over parentheses simplifies the equation, making it easier to combine like terms.

2. Combine Like Terms Before Isolating Variables

Simplify the expression as much as possible before moving variables to one side.

3. Maintain Balance

Whatever operation you perform on one side of the equation, do the same on the other side to maintain equality.

4. Check Your Work

Substitute the found value of x back into the original equation to verify correctness:

- Original equation: $3(x + 4) + 5x = 105510$

- Substitute $x = 13187.25$:

$$3(13187.25 + 4) + 5(13187.25)$$

$$= 3(13191.25) + 65936.25$$

$$= 39573.75 + 65936.25$$

$$= 105510$$

This confirms our solution is correct.

Practical Applications and Implications

Understanding how to solve for x in equations like this has real-world significance:

- Financial Calculations: Determining unknown quantities like savings, investments, or expenses.
- Engineering: Calculating forces, pressures, or other parameters in systems.
- Data Analysis: Solving for variables in models or algorithms.

Summary

- Start by expanding parentheses and simplifying the equation.
- Combine like terms to streamline the expression.
- Isolate the variable by performing inverse operations.
- Divide to find the specific value of x .
- Verify the solution to ensure accuracy.

In this specific problem, the value of x is 13187.25. Mastering these steps improves algebraic fluency and problem-solving confidence, essential skills for academic success and beyond.

Final Thoughts

The process of solving for x in the equation $3(x + 4) + 5x = 105510$ exemplifies fundamental algebraic methods that can be applied to a broad range of mathematical problems. By breaking down complex expressions into manageable steps, you develop a deeper understanding of relationships and variables, empowering you to tackle more challenging equations with confidence. Remember, practice makes perfect—so keep working through diverse problems to sharpen your skills!

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