What Is The Value Of X In The Equation 4(2x + 14) = 0? A 9 B 7 C 7 D 9

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Understanding how to find the value of 'x' in algebraic equations is fundamental in mathematics. The equation 4(2x + 14) = 0 appears straightforward but requires a step-by-step approach to solve accurately. This article will guide you through the process of solving this specific equation, analyze the options provided (A 9, B 7, C 7, D 9), and discuss the broader concepts of algebraic solutions, emphasizing clarity and thoroughness for learners at all levels.

Understanding the Equation 4(2x + 14) = 0

Before diving into solving, it's important to understand the structure of the equation:

- The equation involves a multiplication of 4 with the binomial (2x + 14).
- The entire expression equals zero.
- Our goal is to find the value(s) of x that satisfy this equation.

In algebra, an expression multiplied by a factor equals zero, then at least one of the factors must be zero. This is known as the Zero Product Property.

Applying the Zero Product Property

The Zero Product Property states that:

> If the product of two factors is zero, then at least one of the factors must be zero.

In the equation 4(2x + 14) = 0, the factors are 4 and (2x + 14).

Since 4 is a constant non-zero number, the only way for the entire product to be zero is if the other factor, (2x + 14), equals zero.

This simplifies the problem to solving:

2x + 14 = 0

Solving the Equation 2x + 14 = 0

To find the value of x, follow these algebraic steps:

1. Subtract 14 from both sides:

$2x + 14 - 14 = 0 - 14$

Simplifies to:

$2x = -14$

2. Divide both sides by 2:

$2x / 2 = -14 / 2$

Simplifies to:

$x = -7$

This indicates that the solution to the original equation is $x = -7$.

Interpreting the Multiple Choice Options

Given the options:

- A) 9
- B) 7
- C) 7
- D) 9

It's important to notice that none of these options directly list -7, which is the solution obtained. This suggests a potential typo or misinterpretation in the options provided.

However, if the options intended to include -7 or if the question was misprinted, the key takeaway is understanding how to solve for x properly.

Note: The options A and D are 9, while B and C are 7. Since the solution is -7, none of the options match exactly.

Understanding Why The Correct Solution Is x = -7

Let's reinforce the reasoning:

- When an expression involving multiplication equals zero, one factor must be zero.
- The factor 4 is non-zero, so the other factor must be zero.
- Solving $2x + 14 = 0$ leads directly to $x = -7$.

This is a classic example of solving a linear equation and applying the Zero

Product Property.

Common Mistakes to Avoid in Solving Such Equations

While solving equations like this, students often make errors. Here are common pitfalls and how to avoid them:

1. Forgetting to isolate the variable:

- Always perform inverse operations step-by-step.
- Example: subtract or add constants first before dividing.

2. Ignoring the Zero Product Property:

- Remember, if a product equals zero, then at least one factor must be zero.
- Do not assume both factors are zero unless the equation is explicitly set up as a product equal to zero.

3. Misreading the options:

- Ensure you understand what the options represent.
- In this case, the solution -7 does not match the options provided, which may indicate a typo or a trick question.

4. Overlooking signs:

- Pay attention to negative signs during subtraction and division.

Additional Practice Problems for Mastery

Practice solidifying your understanding with similar problems:

- Solve: $3(x - 4) = 0$
- Solve: $5(2x + 3) = 0$
- Solve: $(x + 5)(x - 2) = 0$

In each case, apply the Zero Product Property and isolate the variable to find the solutions.

Broader Concepts Related to the Equation

Understanding this problem helps reinforce several algebraic concepts:

- Linear equations: Equations where the variable appears to the first power.

- Zero Product Property: A fundamental principle used to solve polynomial equations.
- Factoring: Breaking down expressions into simpler factors to solve equations efficiently.
- Solutions to equations: Values of the variable that satisfy the equation.

Conclusion: Final Thoughts on Solving 4(2x + 14) = 0

The key takeaway from solving the equation 4(2x + 14) = 0 is recognizing that the constant factor 4 does not affect the solution, as it is non-zero. The critical step is setting the inner expression, (2x + 14), equal to zero and solving for x. This leads to x = -7 as the solution.

While the options provided do not include -7, understanding the solution process is essential for mastering algebra. This problem exemplifies how to apply fundamental principles like the Zero Product Property and emphasizes the importance of step-by-step problem-solving.

By practicing similar problems and understanding the underlying concepts, learners can confidently tackle a wide range of algebraic equations with clarity and precision.

Remember: When faced with an equation involving multiplication set equal to zero, always look for factors that can be individually set to zero and solve accordingly. This approach simplifies the process and ensures accurate solutions every time.

Frequently Asked Questions

What is the value of x in the equation 4(2x + 14) = 0?

x = -7

How do you solve the equation 4(2x + 14) = 0 for x?

Divide both sides by 4 to get 2x + 14 = 0, then subtract 14 from both sides to get 2x = -14, and finally divide both sides by 2 to find x = -7.

What are the possible options for the value of x in the given equation?

The options are 9, 7, 7, and 9; the correct solution is x = -7, which is not among the options listed.

Is x = 7 or x = −7 the correct solution for the equation 4(2x + 14) = 0?

The correct solution is x = −7.

Why is x = 7 not a solution to the equation 4(2x + 14) = 0?

Because substituting x = 7 results in 4(2(7) + 14) = 4(14 + 14) = 4(28) = 112, which is not zero.

Does the equation 4(2x + 14) = 0 have more than one solution?

No, after simplifying, it has a unique solution: x = −7.

What does solving 4(2x + 14) = 0 tell us about the value of x?

It indicates that x must be −7 for the equation to hold true.

How are the options A, B, C, D related to the solution of the equation?

Options A and D are 9, options B and C are 7; however, the actual solution is x = −7, which is not listed among these options.

What is the significance of setting the expression inside the parentheses equal to zero?

Since the entire expression is multiplied by 4, which is non-zero, the only way for the product to be zero is if the expression inside the parentheses equals zero, leading to x = −7.

Additional Resources

What Is The Value Of X In The Equation 4(2x + 14) = 0? A 9 B 7 C 7 D 9 is a common question that arises in algebra, often serving as an introductory problem for students learning how to solve equations involving variables and coefficients. Understanding how to find the value of x in such equations is fundamental to mastering algebraic concepts and preparing for more advanced mathematics. In this comprehensive guide, we will walk through the step-by-step process of solving this equation, analyze the possible answers, and clarify common pitfalls to ensure you gain a clear understanding of how to approach similar problems confidently.

Understanding the Equation

Before diving into the solution, it's essential to understand what the equation represents:

Equation: $4(2x + 14) = 0$

This is a linear equation involving a single variable, x. The goal is to isolate x on one side of the equation to find its value. The equation features a coefficient (4), a binomial expression inside parentheses (2x + 14), and an equals sign indicating equality with zero.

Step-by-Step Breakdown of Solving the Equation

Step 1: Recognize the Distributive Property

The given equation involves multiplication across a binomial:

$4(2x + 14)$

Applying the distributive property, we multiply 4 by each term inside the parentheses:

- $4 \cdot 2x = 8x$
- $4 \cdot 14 = 56$

So, the equation simplifies to:

$8x + 56 = 0$

Step 2: Isolate the Variable Term

Next, we aim to get the term containing x alone on one side:

Subtract 56 from both sides of the equation:

$8x + 56 - 56 = 0 - 56$

Which simplifies to:

$8x = -56$

Step 3: Solve for x

Now, divide both sides of the equation by 8 to solve for x:

$x = -56 / 8$

Calculating the division:

$x = -7$

Final Answer

The value of x in the equation $4(2x + 14) = 0$ is $x = -7$.

Analyzing the Multiple-Choice Options

Given the options:

- A) 9
- B) 7
- C) 7
- D) 9

It appears there's some inconsistency or potential typo in the options, especially since our calculation yields x = -7, which is not listed. Let's analyze this:

- The options include positive 7 and 9, but the solution is negative 7.
- It's possible that the options are misprinted or that the question intended to ask for the value of x in a different context.

Important Note: When solving equations like this, always verify the options and ensure the question matches the options provided.

Clarifying Common Mistakes

Mistake 1: Forgetting to distribute properly

Some students might forget to distribute 4 across the binomial. Omitting this step leads to incorrect answers.

Mistake 2: Not isolating the variable correctly

Attempting to solve without subtracting 56 first or dividing by 8 can cause confusion.

Mistake 3: Misreading the question

Given the options, if the question intended to ask for a different expression, or if the options are referring to the constant part, the understanding must be contextualized.

Additional Practice Problems

To reinforce understanding, here are some similar problems:

1. Solve for x: 3(4x - 6) = 0
2. Find x: 5(2x + 10) = 0
3. Determine x: 2(3x + 5) = 0

Answers:

1. x = 1.5
2. x = -10
3. x = -5/3

Summary and Key Takeaways

- Always start by applying the distributive property when dealing with expressions like a(b + c).
- Isolate the term with the variable by performing inverse operations (adding/subtracting, dividing/multiplying).
- Check your work by substituting the solution back into the original equation.
- Be mindful of signs, especially negatives, as they often lead to common mistakes.
- Ensure the answer choices match the solution obtained; if not, verify the problem or consider possible typos.

Final Note on the Original Question

In conclusion, the value of x in 4(2x + 14) = 0 is x = -7. If the multiple-choice options given do not include -7, it may be an error in the options or a different interpretation of the question. Always double-check your calculations and the problem statement to ensure accuracy.

Mastering how to solve equations like this builds a strong foundation in algebra, empowering you to tackle more complex problems with confidence.

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