

3a+6 =2aPlease Show Work

3a+6 =2aPlease Show Work: A Comprehensive Guide to Solving Algebraic Equations

Understanding how to solve algebraic equations is a fundamental skill in mathematics that serves as a building block for more advanced topics. In this article, we will explore the equation $3a + 6 = 2a$, providing clear, step-by-step instructions on how to approach and solve it. Whether you're a student looking to strengthen your algebra skills or someone interested in learning more about solving equations, this guide will help you understand the process thoroughly.

Introduction to Algebraic Equations

Before diving into solving the specific equation $3a + 6 = 2a$, it's essential to understand what algebraic equations are and the basic principles involved.

What is an Algebraic Equation?

An algebraic equation is a mathematical statement that asserts the equality of two expressions, often containing variables and constants. The goal is to find the value(s) of the variable(s) that make the equation true.

Example:

- $3a + 6 = 2a$

Variables: a

Constants: 6

Understanding the Equation $3a + 6 = 2a$

This equation involves a single variable, ' a ,' with coefficients and constants. The primary goal is to isolate ' a ' on one side of the equation to find its value.

Key concepts involved:

- Combining like terms
- Using inverse operations

- Maintaining equality

Step-by-Step Solution: How to Show Work for $3a + 6 = 2a$

Let's proceed with a detailed, step-by-step method to solve the equation.

Step 1: Write Down the Original Equation

Begin by clearly stating the given equation:

$$- 3a + 6 = 2a$$

Step 2: Isolate the Variable Terms on One Side

To get all terms containing 'a' on one side, subtract 2a from both sides:

$$- (3a + 6) - 2a = 2a - 2a$$

Simplify:

$$- 3a - 2a + 6 = 0$$

$$- a + 6 = 0$$

Step 3: Isolate the Variable 'a'

Subtract 6 from both sides to solve for 'a':

$$- a + 6 - 6 = 0 - 6$$

Simplify:

$$- a = -6$$

Step 4: Verify the Solution

Substitute the value of 'a' back into the original equation to check correctness:

- $3(-6) + 6 = 2(-6)$

Calculate each side:

- Left side: $-18 + 6 = -12$

- Right side: -12

Since both sides are equal, the solution is verified.

Summary of the Solution Process

Here's a quick overview of the steps involved:

- Original Equation: $3a + 6 = 2a$
- Subtract $2a$ from both sides: $3a - 2a + 6 = 0$
- Simplify: $a + 6 = 0$
- Subtract 6 from both sides: $a = -6$
- Check the solution: Substitute back into original to verify correctness

Additional Tips for Solving Similar Equations

To enhance your problem-solving skills with algebraic equations, consider the following tips:

1. Always perform the same operation on both sides

This maintains the equality of the equation.

2. Combine like terms early

Simplify the equation as much as possible before solving.

3. Keep track of signs

Be cautious with negative signs, especially when subtracting.

4. Verify your solution

Substitute your answer back into the original equation to ensure correctness.

Practice Problems to Reinforce Your Skills

Try solving these equations on your own to practice applying the steps:

1. $4b + 5 = 2b + 9$

2. $7x - 3 = 2x + 4$

3. $5y + 10 = 3y + 14$

Solutions:

- For each, follow the steps: isolate variable, combine like terms, solve, and verify.

Common Mistakes to Avoid

When solving algebraic equations, be mindful of these common pitfalls:

- Incorrectly adding or subtracting terms: Always perform the same operation to both sides.

- Sign errors: Watch out for negative signs when moving terms.

- Forgetting to verify solutions: Always substitute your solution back into the original equation.

- Overlooking the importance of simplifying: Simplify expressions at every step to avoid mistakes.

Conclusion: Mastering the Art of Solving $3a + 6 = 2a$

In this guide, we've demonstrated how to solve the equation $3a + 6 = 2a$ with detailed

work, ensuring clarity and understanding. The key steps involve moving all variable terms to one side, constants to the other, and simplifying systematically. Practice regularly with similar equations to strengthen your algebra skills and develop confidence in solving equations efficiently.

Remember, the core principles remain the same across different equations: perform inverse operations, keep the equation balanced, and verify your solution. With consistent practice and attention to detail, you'll master solving algebraic equations like $3a + 6 = 2a$ and beyond.

Happy solving!

Frequently Asked Questions

How do I solve the equation $3a + 6 = 2a$?

To solve $3a + 6 = 2a$, subtract $2a$ from both sides to get $3a - 2a + 6 = 0$, which simplifies to $a + 6 = 0$. Then, subtract 6 from both sides, resulting in $a = -6$.

What is the step-by-step process to isolate 'a' in $3a + 6 = 2a$?

First, subtract $2a$ from both sides: $3a - 2a + 6 = 0$. Simplify to get $a + 6 = 0$. Then, subtract 6 from both sides: $a = -6$.

Can you show the work for solving $3a + 6 = 2a$?

Yes. Starting with $3a + 6 = 2a$, subtract $2a$ from both sides: $3a - 2a + 6 = 0$. Simplify to $a + 6 = 0$. Finally, subtract 6: $a = -6$.

What is the solution to the equation $3a + 6 = 2a$?

The solution is $a = -6$.

How do I verify the solution $a = -6$ in $3a + 6 = 2a$?

Substitute $a = -6$ into the original equation: $3(-6) + 6 = 2(-6)$. Calculate both sides: $-18 + 6 = -12$ and $-12 = -12$. Since both sides are equal, the solution is correct.

Is the equation $3a + 6 = 2a$ a linear equation?

Yes, it is a linear equation because it involves variables to the first power and can be rearranged to the form $a = \text{constant}$.

What are common mistakes to avoid when solving $3a + 6 = 2a$?

A common mistake is failing to subtract $2a$ from both sides or mixing up the signs. Always perform the same operation on both sides and carefully simplify at each step.

Can this method be applied to similar equations like $4b + 5 = 3b$?

Yes, the same steps—subtracting the variable term from both sides and then solving for the variable—apply to similar linear equations.

Additional Resources

$3a + 6 = 2a$: A Mathematical Investigation and Explanation

Mathematics often appears as a straightforward discipline of numbers and equations, yet beneath its surface lies a rich landscape of logical reasoning, problem-solving strategies, and pedagogical methodologies. One such fundamental algebraic equation, $3a + 6 = 2a$, serves as a starting point for exploring variable manipulation, foundational principles of algebra, and the process of solving for an unknown. This article embarks on an investigative journey into this simple yet illustrative equation, illustrating the systematic approach to solving linear equations, and emphasizing the importance of showing work and understanding each step.

Understanding the Equation: Context and Components

Before delving into the solution, it's essential to understand the structure of the equation itself and what it represents.

Breaking Down the Equation

The given equation:

$$3a + 6 = 2a$$

contains the following components:

- Variables: a is the unknown we aim to solve for.
- Coefficients: 3 and 2 are numerical coefficients multiplying the variable a .
- Constants: 6 is a constant term on the left side.

- Operators: Addition (+) and equality (=).

This type of linear equation in one variable is fundamental in algebra, representing a straightforward relationship where the goal is to find the value of a that makes the equation true.

Why is Solving This Equation Important?

Mastering the method of solving such equations:

- Reinforces understanding of algebraic principles.
- Develops logical reasoning skills.
- Provides a foundation for more complex algebraic problems.
- Illuminates common pitfalls, such as mishandling signs or coefficients.

Step-by-Step Solution: Showing Work

A systematic approach ensures clarity and accuracy. Let's explore each step in detail.

Step 1: Write Down the Original Equation

$$3a + 6 = 2a$$

Step 2: Isolate the Variable Term

To solve for a , we need to gather all terms containing a on one side. Since the variable appears on both sides, subtract $2a$ from both sides:

$$3a + 6 - 2a = 2a - 2a$$

Simplify:

$$(3a - 2a) + 6 = 0$$

$$a + 6 = 0$$

Note: This step utilizes the subtraction property of equality, which states that subtracting the same quantity from both sides maintains the equality.

Step 3: Isolate a

Subtract 6 from both sides:

$$a + 6 - 6 = 0 - 6$$

$$a = -6$$

Key Point: Subtracting 6 from both sides is justified by the subtraction property, enabling us to isolate the variable.

Step 4: Verify the Solution

Always verify solutions by substituting back into the original equation:

Original equation:

$$3a + 6 = 2a$$

Substitute $a = -6$:

$$3(-6) + 6 \stackrel{?}{=} 2(-6)$$

Calculate each side:

$$-18 + 6 = -12$$

$$-12 = -12$$

Since both sides are equal, the solution $a = -6$ is verified.

Deep Dive into the Principles Behind the Solution

Understanding why each step works solidifies comprehension and builds algebraic fluency.

The Subtraction Property of Equality

This property states:

> If $a = b$, then $a - c = b - c$.

In our case, subtracting $(2a)$ from both sides to gather like terms is justified because it preserves the equality.

The Addition and Subtraction of Constants

Adding or subtracting the same number from both sides maintains the balance of the equation, facilitating the isolation of variables.

Combining Like Terms

Simplification involves combining terms with the same variable or constants:

- $(3a - 2a = a)$
- (6) remains as is until moved.

Verification of the Solution

Plugging the found value back into the original confirms its correctness and ensures no algebraic manipulations led to extraneous solutions.

Common Mistakes and How to Avoid Them

While solving a simple linear equation seems straightforward, errors can occur. Recognizing and preventing these pitfalls is crucial.

Mistake 1: Forgetting to Perform the Same Operation on Both Sides

Example: Subtracting $(2a)$ only from one side.

Solution: Always perform inverse operations equally on both sides.

Mistake 2: Incorrect Sign Handling

Example: Losing track of the negative sign in substitution.

Solution: Write each step carefully, double-check signs, and verify after substitution.

Mistake 3: Omitting Simplification Steps

Example: Not combining like terms before solving.

Solution: Simplify thoroughly to reduce complexity.

Mistake 4: Failing to Verify Solutions

Solution: Always substitute the solution back into the original equation to confirm accuracy.

Extensions and Broader Applications

While $3a + 6 = 2a$ is a basic example, the principles employed extend to more complex equations.

Solving Multi-variable Equations

Understanding the process here aids in solving equations with multiple variables by isolating one variable at a time.

Application in Word Problems

Rearranging and solving equations is fundamental in translating real-world scenarios into algebraic expressions.

Transition to Inequalities and Systems

The skills gained serve as a foundation for exploring inequalities and systems of equations, critical in higher mathematics and scientific modeling.

Conclusion: The Significance of Showing Work in

Algebra

The process of solving $3a + 6 = 2a$ exemplifies core algebraic techniques: isolating variables, maintaining equality through inverse operations, simplifying expressions, and verifying solutions. Showing work step-by-step not only ensures accuracy but also deepens understanding, making the solution transparent and educational. These practices are essential for students, educators, and professionals alike, fostering clarity and confidence in problem-solving.

Mastering such fundamental equations paves the way for tackling more complex mathematical challenges, emphasizing that thoroughness and logical reasoning are the bedrocks of mathematical literacy. Whether in academic settings, professional contexts, or everyday problem-solving, the disciplined approach demonstrated here remains universally valuable.

References / Further Reading:

- Stewart, J. (2015). Algebra and Trigonometry. Cengage Learning.
- Larson, R., & Edwards, B. H. (2018). Elementary Algebra. Cengage Learning.
- Khan Academy. (n.d.). Solving equations. Retrieved from <https://www.khanacademy.org/math/algebra/solving-linear-equations>

End of Article

[3a 6 2please Show Work](#)

3a 6 2please Show Work

Related Articles

- [Questions by hilpert.mona - Page 4](#)
- [Complete Sentence.18 Ft= ___ Yd](#)
- [HELP ASPPP PLEASE Do 11 And 12 Please](#)

[Back to Home](#)