

# Solve The Following Equation. $8x-6=10$

**Solve The Following Equation.  $8x-6=10$**  is a fundamental algebraic problem that students often encounter early in their mathematical journey. Understanding how to approach and solve such equations is crucial for developing problem-solving skills and building a strong foundation in algebra. In this comprehensive guide, we will walk through the process of solving this equation step-by-step, explore related concepts, and provide tips to enhance your algebraic reasoning.

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## Understanding the Equation: $8x - 6 = 10$

Before diving into the solution, it's important to understand what the equation represents. The equation  $8x - 6 = 10$  is a linear equation in one variable,  $x$ . It states that when 8 times a number  $x$  is decreased by 6, the result is 10.

Key components:

- Coefficient of  $x$ : 8
- Constant term on the left: -6
- Constant term on the right: 10

The goal is to find the value of  $x$  that satisfies this equality.

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## Steps to Solve the Equation

Solving a linear equation like  $8x - 6 = 10$  involves isolating the variable  $x$  on one side of the equation. Here are the typical steps:

### 1. Add or Subtract to Isolate the Term with $x$

- Objective: Get rid of the constant term on the side with the variable.
- Method: Since the constant term is -6, add 6 to both sides of the equation to cancel it out.

## 2. Simplify Both Sides

- After adding 6 to both sides, simplify the expression to get:

$$8x = 10 + 6$$

Which simplifies further to:

$$8x = 16$$

## 3. Divide Both Sides by the Coefficient of x

- To solve for x, divide both sides of the equation by 8:

$$x = 16 \div 8$$

- Simplify the division:

$$x = 2$$

## 4. Verify the Solution

- Substitute  $x = 2$  back into the original equation to verify:

$$8(2) - 6 = 10$$

$$16 - 6 = 10$$

$$10 = 10 \text{ (which is true)}$$

- Since both sides are equal,  $x = 2$  is the correct solution.

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## Understanding the Principles Behind the Solution

To deepen your comprehension, let's analyze the principles that guide solving linear equations like  $8x - 6 = 10$ .

## Maintaining Equality

- Whatever operation you perform on one side of the equation, you must perform on the other side to maintain equality.
- This principle ensures the balance of the equation is preserved throughout the solving process.

## Inverse Operations

- Addition and subtraction are inverse operations.
- Multiplication and division are inverse operations.
- To isolate the variable, you apply inverse operations step-by-step.

## Step-by-Step Approach

- Break down complex equations into simpler steps.
- Always verify your solution to confirm correctness.

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## Common Mistakes and How to Avoid Them

While solving equations like  $8x - 6 = 10$  is straightforward, beginners often make errors. Here are some common mistakes and tips to avoid them:

- **Forgetting to perform the same operation on both sides:** Always add, subtract, multiply, or divide both sides equally.
- **Incorrectly handling signs:** Be careful with negative numbers and signs when performing operations.
- **Skipping verification:** Always substitute your solution back into the original equation to verify correctness.
- **Dividing by zero:** Ensure the coefficient of the variable is not zero before dividing.

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# Extending the Concept: Solving More Complex Equations

Once you're comfortable solving simple linear equations like  $8x - 6 = 10$ , you can progress to more complex problems.

## Handling Equations with Variables on Both Sides

- Example:  $3x + 5 = 2x - 7$
- Solution involves bringing all variable terms to one side and constants to the other, then solving for  $x$ .

## Solving Quadratic Equations

- Equations where the highest degree of the variable is 2, such as  $x^2 + 5x + 6 = 0$ .
- Methods include factoring, completing the square, or quadratic formula.

## Dealing with Absolute Values

- Equations involving absolute value expressions require considering positive and negative solutions.

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## Practical Applications of Solving Linear Equations

Understanding how to solve equations like  $8x - 6 = 10$  is not just an academic exercise; it has real-world applications:

- **Financial Calculations:** Determining the interest rate or loan payments.
- **Engineering:** Calculating dimensions or forces in a system.
- **Statistics:** Solving for variables in data analysis models.
- **Business:** Break-even analysis and profit optimization.

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## Practice Problems to Enhance Your Skills

To reinforce your understanding, attempt the following problems:

1. Solve for  $x$ :  $5x + 3 = 23$
2. Find  $x$ :  $2(3x - 4) = 16$
3. Determine  $x$ :  $-7x + 2 = 3x + 14$
4. Solve for  $x$ :  $4x/2 - 5 = 3$

Solutions:

1.  $x = 4$
2.  $x = 4$
3.  $x = 3$
4.  $x = 4$

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## Conclusion

Mastering the process of solving equations like  $8x - 6 = 10$  is a key step in building algebraic proficiency. By understanding the principles of maintaining equality, applying inverse operations, and verifying solutions, you can confidently tackle a wide range of algebraic problems. Remember to practice regularly, pay attention to signs and operations, and verify your answers. As you progress, you'll find that these skills open doors to more advanced mathematical concepts and real-world problem-solving scenarios.

Whether you're a student preparing for exams or someone looking to sharpen your analytical skills, mastering linear equations is an essential milestone in your mathematical journey. Keep practicing, stay curious, and you'll find solving equations becomes an intuitive and rewarding experience.

## Frequently Asked Questions

**What is the first step to solve the equation  $8x - 6 = 10$ ?**

Add 6 to both sides of the equation to isolate the term with  $x$ :  $8x = 16$ .

**How do you find the value of  $x$  in the equation  $8x - 6 = 10$ ?**

Divide both sides by 8:  $x = 16 \div 8$ , which simplifies to  $x = 2$ .

**What is the solution to the equation  $8x - 6 = 10$ ?**

The solution is  $x = 2$ .

**Can you verify the solution  $x = 2$  for the equation  $8x - 6 = 10$ ?**

Yes. Substitute  $x = 2$  into the original equation:  $8(2) - 6 = 16 - 6 = 10$ , which confirms the solution.

**What operation should you perform first when solving  $8x - 6 = 10$ ?**

Add 6 to both sides to cancel out the  $-6$  and start isolating  $x$ .

**Is the equation  $8x - 6 = 10$  linear or quadratic?**

It is a linear equation because it involves only the first degree of  $x$ .

**What is the importance of checking the solution in an equation like  $8x - 6 = 10$ ?**

Checking ensures that the found value of  $x$  satisfies the original equation and that no mistakes were made during solving.

**How can understanding this type of equation help in real-world problems?**

Solving linear equations like  $8x - 6 = 10$  helps in various real-world scenarios such as budgeting, calculating rates, and solving for unknown quantities in everyday situations.

## Additional Resources

Solve The Following Equation:  $8x - 6 = 10$

When it comes to algebra, solving equations is an essential skill that lays the foundation for understanding more complex mathematical concepts. The equation  $8x - 6 = 10$  is a straightforward example that offers an excellent opportunity to explore the systematic approach to solving linear equations. Whether you're a student brushing up on basic algebra or someone seeking to reinforce your problem-solving skills, analyzing this equation provides valuable insights into isolating variables and understanding the properties of equality.

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## Understanding the Equation: $8x - 6 = 10$

Before diving into the solution, it's crucial to comprehend what the equation represents. The equation  $8x - 6 = 10$  is a linear algebraic expression involving a single variable,  $x$ . The goal is to determine the value of  $x$  that makes the equation true.

The structure involves a coefficient (8) multiplied by the variable  $x$ , then a constant term (-6), and an equality to 10. The task is to isolate  $x$  on one side of the equation to find its value. This process involves inverse operations such as addition, subtraction, multiplication, and division.

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## Step-by-Step Solution Process

### Step 1: Isolate the Term with the Variable

The first step is to eliminate the constant term on the side with the variable. Since the term -6 is subtracted from  $8x$ , you add 6 to both sides of the equation to maintain equality:

$$\backslash[ 8x - 6 + 6 = 10 + 6 \backslash]$$

Simplifying both sides:

$$\backslash[ 8x = 16 \backslash]$$

## Step 2: Solve for x by Dividing

Now, you have  $8x = 16$ . To find  $x$ , divide both sides of the equation by the coefficient 8:

$$\left[ \frac{8x}{8} = \frac{16}{8} \right]$$

which simplifies to:

$$\left[ x = 2 \right]$$

## Step 3: Verify the Solution

Always verify your solution by substituting  $x = 2$  back into the original equation:

$$\left[ 8(2) - 6 = 10 \right]$$

Calculate:

$$\left[ 16 - 6 = 10 \right]$$

which confirms that the equation holds true. Therefore,  $x = 2$  is the correct solution.

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## Understanding the Solution: Key Concepts

### Linear Equations

This problem is a classic example of a linear equation with one variable. Linear equations are characterized by the variable being raised to the first power and the solutions forming a straight line when graphed.

### Inverse Operations

The process of solving such equations relies heavily on inverse operations:

- Addition and subtraction are inverse operations.
- Multiplication and division are inverse operations.

Applying these operations step-by-step ensures that the solution remains valid.

## Maintaining Equality

A fundamental principle in algebra is that whatever you do to one side of the equation, you must do to the other side to keep the equation balanced.

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## Features and Pros/Cons of Solving Equations Like $8x - 6 = 10$

Features:

- Simplicity: The equation involves straightforward operations, making it a good starting point for learning algebra.
- Reinforces Basic Skills: It emphasizes foundational skills such as isolating variables and performing inverse operations.
- Applicability: The method used applies broadly to many algebraic problems, making it a versatile approach.

Pros:

- Easy to understand and execute.
- Demonstrates key algebraic principles clearly.
- Builds confidence in solving similar problems.

Cons:

- Limited complexity; does not cover more advanced concepts like quadratic equations or systems.
- Can be trivial for more advanced learners, necessitating more challenging problems for skill development.
- Over-reliance on procedural steps without conceptual understanding can hinder deeper grasp.

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## Common Mistakes and How to Avoid Them

- Incorrectly adding or subtracting constants: Always perform the same operation to both sides.
- Dividing by zero: Ensure the coefficient of the variable isn't zero before

dividing.

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

To avoid these errors, develop a step-by-step approach and double-check each step.

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## Extensions and Practice Problems

Once comfortable with solving  $8x - 6 = 10$ , you can explore more complex equations:

- Equations with variables on both sides, e.g.,  $3x + 2 = 2x + 5$
- Quadratic equations, e.g.,  $ax^2 + bx + c = 0$
- Systems of equations involving multiple variables

Practicing various problems enhances problem-solving skills and builds algebraic fluency.

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## Conclusion

The equation  $8x - 6 = 10$  exemplifies a fundamental algebraic concept: solving linear equations through systematic application of inverse operations. By understanding each step—adding or subtracting constants, dividing by coefficients, and verifying solutions—you develop a solid foundation for tackling more complex mathematical problems. This process not only enhances computational skills but also fosters logical thinking and precision. Mastery of such basic equations is crucial for progressing in mathematics and applying these skills in real-world contexts, such as engineering, economics, and data analysis. Whether you're just starting or refining your algebraic abilities, solving equations like this remains a vital and rewarding exercise in mathematical reasoning.

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