# What Are The Solutions Of 2x–6x+5=0?

**What Are The Solutions Of 2x–6x+5=0?**

Understanding how to find solutions to algebraic equations is fundamental in mathematics. One common type of algebraic problem involves solving linear equations, which, despite their simplicity, serve as the building blocks for more complex algebraic concepts. In this article, we will explore the solutions of the equation $2x - 6x + 5 = 0$ in detail. We will break down the steps involved, explain the underlying principles, and provide useful tips to master solving similar equations.

---

## Understanding the Equation 2x - 6x + 5 = 0

Before diving into solving the equation, it's essential to understand its structure. The given equation:

$$ 2x - 6x + 5 = 0 $$

is a linear equation in one variable, $x$. It involves combining like terms and then isolating $x$ to find its value(s).

---

## Step-by-Step Solution Process

Solving the equation involves a few straightforward steps:

### Step 1: Combine Like Terms

Identify terms in the equation that involve $x$ and combine them:

- $2x$ and $-6x$ are like terms because they both involve $x$.

Combine:

$$ 2x - 6x = -4x $$

Now, the equation simplifies to:

$$ -4x + 5 = 0 $$

### Step 2: Isolate the Variable Term

Subtract 5 from both sides to move the constant term to the right:

$$ -4x + 5 - 5 = 0 - 5 $$

which simplifies to:

$$ -4x = -5 $$

### Step 3: Solve for x

Divide both sides by -4 to isolate x:

$$ x = \frac{-5}{-4} $$

Simplify:

$$ x = \frac{5}{4} $$

So, the solution to the equation is:

$$ \boxed{\frac{5}{4}} $$

---

## Understanding the Solution

The solution $ x = \frac{5}{4} $ means that when x takes the value $ \frac{5}{4} $, the original equation holds true. To verify, substitute $ x = \frac{5}{4} $ back into the original equation:

$$ 2 \times \frac{5}{4} - 6 \times \frac{5}{4} + 5 = 0 $$

Calculate each term:

$$ \frac{10}{4} - \frac{30}{4} + 5 $$

Simplify:

$$ \frac{10}{4} - \frac{30}{4} + 5 = -\frac{20}{4} + 5 = -5 + 5 = 0 $$

Since the left side equals zero, the solution is verified.

---

## Common Mistakes to Avoid When Solving Linear Equations

While solving equations like 2x - 6x + 5 = 0 is straightforward, students often make mistakes. Here are common pitfalls and tips to avoid them:

### 1. Forgetting to Combine Like Terms Correctly

- Always identify and combine like terms carefully.
- Double-check your combination to avoid errors.

## 2. Sign Errors During Addition or Subtraction

- Be cautious with negative signs.
- When moving terms across the equal sign, change their signs accordingly.

## 3. Incorrect Division

- Ensure you divide all terms correctly when isolating the variable.
- Remember that dividing both sides of the equation by a negative number flips the inequality sign (not relevant here but good to keep in mind).

## 4. Overlooking the Possibility of Multiple or No Solutions

- For linear equations, solutions are usually unique.
- Be aware that an equation might also have no solution or infinitely many solutions in other contexts.

---

# Other Types of Equations and Their Solutions

While this article focuses on a simple linear equation, understanding the different types of equations and their solutions is helpful:

## 1. Linear Equations

- Form: $ax + b = 0$
- Solution: a single value for x

## 2. Quadratic Equations

- Form: $ax^2 + bx + c = 0$
- Solutions: can be real or complex, found using factoring, quadratic formula, or completing the square

## 3. Polynomial Equations

- Higher degree equations with multiple solutions

## 4. Rational Equations

- Involving fractions; solutions must exclude values that make denominators zero

## 5. Absolute Value Equations

- Equations involving $|x|$; often lead to two solutions

---

# Additional Tips for Solving Linear Equations

- Write each step clearly to avoid mistakes.
- Always check your solution by substituting back into the original equation.
- Practice solving different types of equations to build confidence.
- Use algebraic properties (commutative, associative, distributive) to simplify expressions effectively.
- When dealing with fractions, find common denominators when necessary.

---

# Practice Problems to Master Solving Equations

Try solving the following equations to reinforce your understanding:

1. $3x + 7 = 0$
2. $-5x + 10 = 0$
3. $2(x - 3) = 4$
4. $\frac{1}{2}x - 3 = 0$
5. $4x - 2x + 8 = 0$

Solutions:

1. $x = -\frac{7}{3}$
2. $x = 2$
3. $2x - 6 = 4 \Rightarrow 2x = 10 \Rightarrow x = 5$
4. $\frac{1}{2}x = 3 \Rightarrow x = 6$
5. $2x + 8 = 0 \Rightarrow 2x = -8 \Rightarrow x = -4$

---

# Conclusion

In summary, solving the equation $2x - 6x + 5 = 0$ involves combining like terms, isolating the variable, and simplifying to find the unique solution $x = \frac{5}{4}$. Mastery of this process is essential for tackling more complex algebraic problems. Remember to verify your solutions and avoid common mistakes to develop strong problem-solving skills. With practice, solving linear equations will become a quick and straightforward process, laying a solid foundation for future mathematical learning.

## Frequently Asked Questions

### What is the first step to solve the equation 2x - 6x + 5 = 0?

Combine like terms to simplify the equation: 2x - 6x + 5 = 0 simplifies to -4x + 5 = 0.

### How do I isolate the variable x in the equation -4x + 5 = 0?

Subtract 5 from both sides to get -4x = -5, then divide both sides by -4 to find x.

### What is the solution to the equation 2x - 6x + 5 = 0?

The solution is x = 5/4 or 1.25.

### Is the equation 2x - 6x + 5 = 0 linear or quadratic?

It is a linear equation because the highest power of x is 1 after simplification.

### Can the equation 2x - 6x + 5 = 0 have multiple solutions?

No, after simplifying, it has a single solution because it reduces to a linear equation with one solution.

### What happens if the simplified form of the equation results in a contradiction?

If simplifying results in a statement like 0 = a non-zero number, then the equation has no solution.

### How does understanding solving linear equations like 2x - 6x + 5 = 0 help in real-world applications?

It helps in solving problems involving relationships between variables, such as budgeting, engineering, and data analysis.

## Additional Resources

What Are The Solutions Of 2x-6x+5=0? An In-Depth Investigation into Linear Equations and Their Solutions

---

Mathematics, often regarded as the language of the universe, provides us with tools and concepts to decode the complexities of the world around us. Among these foundational tools are algebraic equations—expressions that establish relationships between variables. One such fundamental problem is solving linear equations, which, despite their simplicity, form the backbone of more advanced mathematical concepts. Today, we delve into a specific example: What are the solutions of $2x - 6x + 5 = 0$?

This question may appear straightforward at first glance, but uncovering the solution involves a series of logical steps, understanding the structure of the equation, and appreciating the underlying principles that govern linear equations. In this comprehensive review, we will explore the nature of linear equations, the methods employed to solve them, and analyze the particular equation in question to understand its solutions thoroughly.

---

# Understanding the Structure of Linear Equations

Linear equations are algebraic expressions where the variable(s) are of the first degree, meaning they are raised to the power of one. These equations typically take the form:

$$ ax + b = 0 $$

where $a$ and $b$ are constants, and $x$ is the variable.

Key features of linear equations:

- The highest power of the variable is one.
- The graph of a linear equation in two variables is a straight line.
- Solutions are values of the variable(s) that satisfy the equation.

Why are linear equations important?

They serve as the foundation for understanding more complex equations and systems. They model real-world problems such as budgeting, physics, engineering, and computer science.

---

# Analyzing the Equation: 2x - 6x + 5 = 0

Let's examine the specific equation:

$$ 2x - 6x + 5 = 0 $$

At first glance, it appears to be a linear equation. However, simplifying it properly reveals its true nature.

Step 1: Combine like terms

The terms $2x$ and $-6x$ are like terms and can be combined:

$$ (2x - 6x) + 5 = 0 $$

$$ -4x + 5 = 0 $$

This simplified form is a standard linear equation:

$$ -4x + 5 = 0 $$

Step 2: Isolate the variable

To find the solution:

$$ -4x = -5 $$

$$ x = \frac{-5}{-4} $$

$$ x = \frac{5}{4} $$

Thus, the solution to this equation is:

$$ x = \frac{5}{4} $$

or as a decimal:

$$ x = 1.25 $$

This straightforward process demonstrates the elegance of algebra: simplifying complex-looking equations to reveal their solutions.

---

# Methodologies for Solving Linear Equations

While the above example is simple, the process can become more involved with equations containing multiple variables, higher degrees, or more complex structures. Here, we outline common solution methods applicable to a broad class of linear equations.

## 1. Direct Simplification

As demonstrated earlier, combining like terms and isolating the variable directly yields the solution.

Applicability: Suitable for equations with straightforward terms, like the example.

## 2. Addition or Subtraction Method

Used when solving systems of equations, this method involves adding or subtracting equations to eliminate a variable.

Example:

Given the system:

\[
\begin{cases}

ax + by = c \\
dx + ey = f
\end{cases}
\]

By multiplying and adding equations appropriately, one variable can be eliminated, and the remaining variable can be solved.

### 3. Substitution Method

Useful when one of the equations is already solved for one variable, allowing substitution into the other equations.

### 4. Elimination Method

Similar to addition/subtraction, but involves manipulating equations to cancel out variables systematically.

### 5. Graphical Solution

Plotting the equations and identifying the point(s) of intersection provides a visual solution, especially in two variables.

---

## Special Cases in Linear Equations

While the example solution was straightforward, linear equations can sometimes yield special cases:

### 1. Unique Solution

When the simplified equation yields a single value for the variable, as in the example $x=5/4$.

### 2. Infinite Solutions

If the simplified form reduces to an identity like $0=0$, the original equation has infinitely many solutions (the equations are dependent).

Example:

$$ 3x + 2 = 3x + 2 $$

which is true for all $x$.

## 3. No Solution

If simplification results in a contradiction, such as $0 = 5$, the equation has no solution.

Example:

$$ 2x + 3 = 2x + 5 $$

Subtracting $2x$ from both sides:

$$ 3 = 5 $$

which is false, indicating no solution exists.

---

# Implications and Applications of Solving Linear Equations

Understanding solutions to equations like $2x - 6x + 5 = 0$ is more than an academic exercise; it has practical implications:

- Engineering & Physics: Calculating forces, velocities, and other quantities.
- Economics & Business: Budgeting, profit analysis, and cost modeling.
- Computer Science: Algorithm design, data structures, and problem-solving.
- Statistics: Data fitting and regression analysis.

Furthermore, the ability to quickly simplify and solve these equations enhances problem-solving efficiency in various fields.

---

# Common Misconceptions and Pitfalls

Despite their simplicity, students and practitioners often encounter misconceptions:

- Misidentifying like terms: Confusing similar but not identical terms.
- Neglecting signs: Failing to account for positive and negative signs during manipulation.
- Overlooking special cases: Not recognizing when an equation has infinitely many solutions or none.
- Assuming solutions always exist: Not all equations are solvable or have solutions.

Understanding these pitfalls ensures accurate solutions and deepens conceptual comprehension.

---

## Conclusion: The Significance of Solving 2x - 6x + 5 = 0

The investigation into the solutions of the equation $2x - 6x + 5 = 0$ exemplifies the core principles of algebra: simplification, isolation of variables, and logical reasoning. The solution, $x=5/4$, underscores the importance of methodical approaches—combining like terms, isolating variables, and verifying solutions.

More broadly, mastering such linear equations establishes a foundation for tackling more complex problems across scientific and practical domains. Whether dealing with multiple variables or systems of equations, the strategies applied here remain relevant and vital.

In essence, this exploration demonstrates that even seemingly simple equations encapsulate a universe of mathematical reasoning, critical thinking, and real-world application. As we continue to develop and refine our problem-solving toolkit, the ability to effectively solve equations like $2x - 6x + 5 = 0$ remains a cornerstone of mathematical literacy and analytical prowess.

---

In summary:

- The simplified form of the equation is $-4x + 5 = 0$.
- The solution is $x = \frac{5}{4}$.
- Methods employed include simplifying, combining like terms, and isolating the variable.
- Recognizing special cases ensures comprehensive understanding.
- These skills are fundamental in various scientific and practical applications.

Understanding solutions to linear equations is more than an academic pursuit—it's a vital skill that bridges theory and real-world problem-solving.

## What Are The Solutions Of 2x 6x 5 0

What Are The Solutions Of 2x 6x 5 0

## Related Articles


- Questions by price99 - Page 10
- Look At PicturePlease Help:(
- Graph The Function. F(x)=|x+2|-1

Back to Home