For The Quadratic Equation 2x - 6x + 7 = 0, Enter The Correct Values Of A, B, And C.X =-b B - 4ac2a

For The Quadratic Equation 2x - 6x + 7 = 0, Enter The Correct Values Of A, B, And C.X =-b B - 4ac2a is a phrase that often appears in algebraic problem-solving, especially when working with quadratic equations. Understanding how to identify the coefficients and correctly apply the quadratic formula is essential for students, educators, and anyone interested in mastering algebra. Quadratic equations are a fundamental part of algebra, and their solutions often involve understanding the structure of the equation, the coefficients involved, and how to apply the quadratic formula accurately. In this comprehensive article, we will explore the process of identifying the coefficients, how to correctly apply the quadratic formula, and provide detailed examples to enhance your understanding. Whether you're preparing for exams or seeking to improve your algebra skills, this guide will serve as a valuable resource.

Understanding the Quadratic Equation

What Is a Quadratic Equation?

A quadratic equation is a second-degree polynomial equation in a single variable, typically expressed in the form:

$$ax^2 + bx + c = 0$$

where:
- $a \neq 0$ (since if $a = 0$, the equation simplifies to a linear equation),
- b is the coefficient of x,
- c is the constant term.

Quadratic equations are used extensively across various fields such as physics, engineering, and economics to model parabolic relationships, projectile motion, and optimization problems.

The Standard Form

The standard form of a quadratic equation is crucial because it allows you to identify the coefficients a, b, and c, which are necessary for solving the equation using the quadratic formula.

Identifying Coefficients in a Quadratic Equation

Given Equation: 2x - 6x + 7 = 0

At first glance, the equation appears to be a bit confusing because of the similar terms. Let’s carefully analyze this equation:

$$ 2x - 6x + 7 = 0 $$

Combine like terms:
$$ (2x - 6x) + 7 = 0 $$
$$ -4x + 7 = 0 $$

Now, this simplified form is linear, not quadratic. However, for the purpose of this tutorial, let’s assume the original question is a typo or that you meant a quadratic form such as:

$$ 2x^2 - 6x + 7 = 0 $$

This is a typical quadratic equation where:
- $a = 2$
- $b = -6$
- $c = 7$

Note: The original expression, as written, simplifies to a linear equation and does not require the quadratic formula. To illustrate the process of entering values for a quadratic formula, we will proceed with the assumption that the intended equation is:

$$ 2x^2 - 6x + 7 = 0 $$

Applying the Quadratic Formula

The Quadratic Formula

The quadratic formula provides a method to find the roots (solutions) of any quadratic equation:

$$ x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a} $$

Key components:

- a, b, and c are coefficients from the quadratic equation.
- The discriminant, $\Delta = b^2 - 4ac$, determines the nature of the roots:
- If $\Delta > 0$, there are two real and distinct roots.
- If $\Delta = 0$, there is one real root (a repeated root).
- If $\Delta < 0$, the roots are complex conjugates.

Step-by-Step Guide to Entering Values of A, B, and C

Step 1: Write Down the Quadratic Equation

Ensure the equation is in standard form:

$$ ax^2 + bx + c = 0 $$

In our example:

$$ 2x^2 - 6x + 7 = 0 $$

Step 2: Identify the Coefficients

From the standard form:
- $a = 2$
- $b = -6$
- $c = 7$

Step 3: Plug the Coefficients into the Quadratic Formula

Substitute a, b, and c into the formula:

$$ x = \frac{-(-6) \pm \sqrt{(-6)^2 - 4 \times 2 \times 7}}{2 \times 2} $$

Simplify step-by-step:
- $-(-6) = 6$
- $(-6)^2 = 36$
- $4 \times 2 \times 7 = 56$
- Discriminant $\Delta = 36 - 56 = -20$

Since the discriminant is negative, the solutions will be complex.

Calculating the Roots

Step 4: Compute the Roots

Using the quadratic formula:

$$ x = \frac{6 \pm \sqrt{-20}}{4} $$

Express the square root of a negative number:

$$ \sqrt{-20} = \sqrt{20} \times i $$

Where i is the imaginary unit ($i^2 = -1$). Simplify $\sqrt{20}$:

$$ \sqrt{20} = \sqrt{4 \times 5} = 2 \sqrt{5} $$

So, the roots are:

$$ x = \frac{6 \pm 2 \sqrt{5} i}{4} $$

Simplify numerator and denominator:

$$ x = \frac{6}{4} \pm \frac{2 \sqrt{5} i}{4} $$
$$ x = \frac{3}{2} \pm \frac{\sqrt{5} i}{2} $$

Final solutions:

$$ x = \frac{3}{2} \pm \frac{\sqrt{5}}{2} i $$

This indicates the quadratic equation has two complex conjugate roots.

Summary of Key Points for Solving Quadratic Equations

- Always write the quadratic in standard form: $ax^2 + bx + c = 0$.
- Identify coefficients a, b, and c carefully.
- Calculate the discriminant $\Delta = b^2 - 4ac$ to determine the nature of roots.
- Apply the quadratic formula, substituting the identified coefficients.
- Handle complex roots appropriately if the discriminant is negative.

Additional Tips and Common Mistakes

Tips for Accurate Calculation

1. Always double-check your coefficients before plugging into the formula.
2. Simplify the discriminant carefully, especially when dealing with square roots.
3. Keep track of positive and negative signs throughout the process.
4. Use a calculator for complex calculations, but verify the input.

Common Mistakes to Avoid

- Forgetting to simplify the quadratic equation before identifying coefficients.
- Mixing up signs of b during substitution.
- Neglecting the case when the discriminant is negative, leading to incorrect real solutions.
- Miscalculating the discriminant or the square root.

Practical Examples and Practice Problems

Example 1: Solving $3x^2 + 4x - 5 = 0$

- $a = 3$, $b = 4$, $c = -5$
- Discriminant: $4^2 - 4 \times 3 \times (-5) = 16 + 60 = 76$
- Roots:

$$ x = \frac{-4 \pm \sqrt{76}}{2 \times 3} = \frac{-4 \pm 2 \sqrt{19}}{6} $$
$$ x = \frac{-2 \pm \sqrt{19}}{3} $$

Practice Problem: Solve $x^2 - 2x + 1 = 0$

- Identify coefficients: $a = 1$, $b = -2$, $c = 1$
- Discriminant: $(-2)^2 - 4 \times 1 \times 1 = 4 - 4 = 0$
- Roots:

$$ x = \frac{-(-2) \pm \sqrt{0}}{2 \times 1} = \frac{2 \pm 0}{2} = 1 $$

This quadratic has a repeated root at $x = 1$.

Conclusion: Mastering the Quadratic Formula

Understanding how to correctly identify the coefficients a, b, and c in a quadratic equation is fundamental to solving problems accurately. Whether the solutions are real or

Frequently Asked Questions

What are the values of a, b, and c in the quadratic equation 2x^2 - 6x + 7 = 0?

The values are $a = 2$, $b = -6$, and $c = 7$.

How do you apply the quadratic formula to solve 2x^2 - 6x + 7 = 0?

Identify $a = 2$, $b = -6$, $c = 7$, then use $x = (-b \pm \sqrt{b^2 - 4ac}) / (2a)$.

What is the value of the discriminant for the quadratic 2x^2 - 6x + 7?

The discriminant is $b^2 - 4ac = (-6)^2 - 427 = 36 - 56 = -20$.

What does a negative discriminant indicate about the roots of 2x^2 - 6x + 7?

A negative discriminant indicates that the quadratic has complex (imaginary) roots.

How do you compute the roots of 2x^2 - 6x + 7 using the quadratic formula?

Calculate $x = [6 \pm \sqrt{-20}] / (4)$. Since the discriminant is negative, roots will be complex: $x = (6 \pm i\sqrt{20}) / 4$.

Can the quadratic equation 2x^2 - 6x + 7 be factored easily?

No, because the discriminant is negative, indicating the roots are complex, so it cannot be factored over real numbers.

What is the simplified form of the solutions for 2x^2 - 6x + 7?

The solutions are $x = (3 \pm i\sqrt{5}) / 2$, obtained by simplifying the quadratic formula with the complex roots.

Additional Resources

Understanding the Quadratic Equation: Identifying A, B, and C for the Equation 2x - 6x + 7 = 0

When approaching quadratic equations, one of the fundamental steps is to correctly identify the coefficients A, B, and C. These coefficients are crucial because they determine the shape and position of the parabola represented by the quadratic function, as well as the solutions (roots) of the equation itself. In this guide, we will explore how to interpret and find these values in the equation 2x - 6x + 7 = 0, and understand how they fit into the quadratic formula:

$$ x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a} $$

This article will provide a detailed breakdown of the process, including clarifications on the standard form of quadratic equations, the importance of coefficients, and practical examples to solidify understanding.

What Is a Quadratic Equation?

A quadratic equation is any polynomial equation of the second degree, generally written in the form:

$ax^2 + bx + c = 0$

where:
- a, b, and c are constants (coefficients),
- $a \neq 0$,
- x is the variable.

Quadratic equations are fundamental in algebra because they describe parabolas and appear in various real-world scenarios, such as projectile motion, economics, and engineering.

Recognizing the Standard Form and Coefficient Identification

The first step in analyzing a quadratic equation is to write it in standard form:

$$ ax^2 + bx + c = 0 $$

Given the equation: 2x - 6x + 7 = 0

At first glance, this may look confusing because it appears to have two linear terms involving x. However, we can simplify or rearrange this to fit the standard form.

Step 1: Simplify the Equation

Combine like terms:

2x - 6x + 7 = 0
=> (2x - 6x) + 7 = 0
=> -4x + 7 = 0

Now, the equation simplifies to:

$-4x + 7 = 0$

Step 2: Identify A, B, and C

Notice that, after simplification, the equation has no quadratic term (x^2). This suggests that $a = 0$, which typically means the equation is linear, not quadratic.

However, if the original problem intended to involve a quadratic term, perhaps it was mistyped.

Clarifying the Equation: Is It Truly Quadratic?

Scenario 1: The original equation was intended to be quadratic:

Suppose the original quadratic equation is:

$2x^2 - 6x + 7 = 0$

In this case:
- $a = 2$ (coefficient of x^2),
- $b = -6$ (coefficient of x),
- $c = 7$ (constant term).

This is the standard form and allows us to apply the quadratic formula directly.

Scenario 2: The original equation is linear:

If the equation is $-4x + 7 = 0$, then $a = 0$, and the quadratic formula does not apply. Instead, the solution is straightforward:

$x = -c / b = -7 / -4 = 7/4$

But given the style of the question and the quadratic formula provided, it seems more likely that the intended equation was quadratic: $2x^2 - 6x + 7 = 0$.

Applying the Quadratic Formula

Assuming the quadratic equation:

$2x^2 - 6x + 7 = 0$

the coefficients are:

- $A = 2$
- $B = -6$
- $C = 7$

The quadratic formula:

$$ x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a} $$

becomes:

$$ x = \frac{-(-6) \pm \sqrt{(-6)^2 - 4 \times 2 \times 7}}{2 \times 2} $$

which simplifies to:

$$ x = \frac{6 \pm \sqrt{36 - 56}}{4} $$

Calculating the Discriminant

The discriminant $D = b^2 - 4ac$ determines the nature of the roots:

- If $D > 0$, there are two real roots.
- If $D = 0$, there is one real root (a repeated root).
- If $D < 0$, the roots are complex conjugates.

In our case:

$$ D = 36 - 56 = -20 $$

Since $D < 0$, the roots are complex.

Finding the Roots

Using the quadratic formula:

$$ x = \frac{6 \pm \sqrt{-20}}{4} $$

Express the square root of a negative number:

$$ \sqrt{-20} = \sqrt{20} \times i = 2 \sqrt{5} \times i $$

Thus:

$$ x = \frac{6 \pm 2 \sqrt{5} i}{4} $$

Simplify numerator and denominator:

$$ x = \frac{6}{4} \pm \frac{2 \sqrt{5} i}{4} $$

$$ x = \frac{3}{2} \pm \frac{\sqrt{5} i}{2} $$

Final solutions:

$x = \frac{3}{2} \pm \frac{\sqrt{5} i}{2}$

These are complex conjugate roots, which are typical when the discriminant is negative.

Summary of Key Values: A, B, and C

Coefficient	Value	Explanation
A	2	Coefficient of x^2 (quadratic term)
B	-6	Coefficient of x
C	7	Constant term

Knowing these values allows you to apply the quadratic formula accurately and interpret the nature of the solutions.

Practical Tips for Handling Quadratic Equations

- Always write the equation in standard form: $ax^2 + bx + c = 0$.
- Identify A, B, and C carefully, especially when terms are combined or rearranged.
- Calculate the discriminant to determine the type of roots:
- Positive: two real roots.
- Zero: one real root.
- Negative: complex roots.
- Apply the quadratic formula correctly, paying attention to signs.
- Simplify roots as much as possible, especially when dealing with square roots of negatives.

Common Mistakes to Avoid

- Misidentifying coefficients: Ensure the equation is in standard quadratic form before extracting A, B, and C.
- Forgetting to simplify the equation before identifying coefficients.
- Ignoring the discriminant: It provides valuable information about the roots.
- Misapplying the quadratic formula with incorrect signs or arithmetic errors.

Conclusion

Understanding how to correctly identify the values of A, B, and C in a quadratic equation like $2x - 6x + 7 = 0$ (or its quadratic form $2x^2 - 6x + 7 = 0$) is essential for solving the equation accurately. Once these coefficients are known, applying the quadratic formula becomes straightforward, allowing you to determine the roots and analyze the nature of the solutions—whether real or complex. Remember, clarity in recognizing the standard form and careful calculation are key to mastering quadratic equations.

Final Notes

Always double-check your simplified form and coefficients before proceeding with the quadratic formula. Practice with various equations to build confidence, and utilize this approach as a consistent method for solving quadratic problems efficiently.

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