# Using The Quadratic Formula, Solve Theequation Below To Find The Two Possiblevalues Of T.6x^2-35=-11xGive

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When tackling quadratic equations, the quadratic formula is a fundamental tool that allows us to find the solutions or roots of the equations quickly and accurately. In this article, we will focus on solving the specific quadratic equation: $6x^2 - 35 = -11x$, to determine the two possible values of the variable T. Although the original equation uses x, we will interpret the variable as T to align with the problem's wording. We will explore each step in detail, ensuring clarity for learners at various levels and emphasizing the importance of the quadratic formula in algebra.

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## Understanding the Quadratic Equation

Before diving into solving the specific problem, it is important to understand what a quadratic equation is and why the quadratic formula is essential.

### What Is a Quadratic Equation?

A quadratic equation is any polynomial equation of degree 2, generally written in the form:

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

where:
- $a \neq 0$,
- $b$, and
- $c$ are coefficients.

Quadratic equations graph as parabolas on the coordinate plane and have up to two real solutions, which are the points where the parabola intersects the x-axis.

### Why Use the Quadratic Formula?

The quadratic formula provides a direct method to find solutions for any quadratic equation, regardless of whether the roots are real or complex. It is expressed as:

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

The term under the square root, $b^2 - 4ac$, is called the discriminant, which determines the nature and number of roots:
- If the discriminant is positive, there are two real roots.
- If it is zero, there is exactly one real root (a repeated root).
- If it is negative, there are two complex roots.

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# Rearranging the Equation to Standard Form

Given the original equation:

$$ 6x^2 - 35 = -11x $$

Our first step is to bring all terms to one side to set the equation equal to zero, making it suitable for applying the quadratic formula.

## Step 1: Move all terms to one side

Add $11x$ to both sides:

$$ 6x^2 + 11x - 35 = 0 $$

Now, the equation is in the standard quadratic form:

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

with:
- $a = 6$,
- $b = 11$,
- $c = -35$.

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# Applying the Quadratic Formula to Find the Roots

With the equation in standard form, we can now substitute the coefficients into the quadratic formula.

## Step 1: Write the quadratic formula

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

## Step 2: Substitute the coefficients

$$
x = \frac{-11 \pm \sqrt{11^2 - 4 \times 6 \times (-35)}}{2 \times 6}
$$

Calculating the discriminant:

$$
b^2 - 4ac = 11^2 - 4 \times 6 \times (-35)
$$

$$
= 121 - (-840)
$$

$$
= 121 + 840 = 961
$$

Since the discriminant is positive, we will have two real roots.

## Step 3: Simplify the square root

$$
\sqrt{961} = 31
$$

## Step 4: Calculate the roots

Now, substitute back into the formula:

$$
x = \frac{-11 \pm 31}{2 \times 6} = \frac{-11 \pm 31}{12}
$$

This gives two solutions:

1. $x = \frac{-11 + 31}{12} = \frac{20}{12} = \frac{5}{3}$

2. $x = \frac{-11 - 31}{12} = \frac{-42}{12} = -\frac{7}{2}$

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## Interpreting the Solutions

The two solutions obtained are:

- $T = \frac{5}{3}$
- $T = -\frac{7}{2}$

These are the two possible values of T satisfying the original quadratic equation. Understanding these solutions in context depends on the specific application, but mathematically, they are the roots of the quadratic.

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## Step-by-Step Summary of the Solution Process

To ensure clarity, here is a summarized list of steps taken to solve the equation:

1. Rewrite the equation in standard quadratic form:

$$6x^2 + 11x - 35 = 0$$

2. Identify coefficients:

$$a = 6, \quad b = 11, \quad c = -35$$

3. Calculate the discriminant:

$$\Delta = b^2 - 4ac = 121 + 840 = 961$$

4. Compute the square root of the discriminant:

$$\sqrt{961} = 31$$

5. Apply the quadratic formula:

$$x = \frac{-b \pm \sqrt{\Delta}}{2a} = \frac{-11 \pm 31}{12}$$

6. Find the two solutions:

- $x = \frac{20}{12} = \frac{5}{3}$
- $x = \frac{-42}{12} = -\frac{7}{2}$

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## Additional Tips for Solving Quadratic Equations

Understanding the process of solving quadratics involves more than just applying the formula. Here are some helpful tips:

- Always check if the quadratic can be factored easily before applying the quadratic formula.
- Calculate the discriminant first to determine the nature of the roots.
- Simplify solutions to their lowest terms for clarity.
- Confirm solutions by substituting back into the original equation to verify correctness.
- Be aware of complex solutions if the discriminant is negative, which involves imaginary numbers.

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## Applications of Quadratic Equations in Real Life

Quadratic equations are not just academic exercises—they are used extensively in various fields:

- Physics: To calculate projectile motion, including the path of a thrown object.
- Engineering: For analyzing structures and stability.
- Economics: To model profit maximization and cost functions.
- Biology: In population modeling where growth rates follow quadratic patterns.
- Computer Graphics: To render curves and shapes.

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## Conclusion

Using the quadratic formula to solve equations like $6x^2 - 35 = -11x$ provides a systematic approach to find the solutions efficiently. By converting the equation into standard form, calculating the discriminant, and applying the formula, we identified the two possible values of T: $\frac{5}{3}$ and $-\frac{7}{2}$. Mastery of this method is essential for students and professionals working with quadratic equations across various disciplines.

Remember, understanding the underlying principles and steps involved in solving quadratics enhances problem-solving skills and builds a solid foundation for more advanced mathematical concepts.

## Frequently Asked Questions

### How do I set the quadratic equation 6x^2 - 35 = -11x into standard form for using the quadratic formula?

To set the equation into standard form, add 11x to both sides: 6x^2 + 11x - 35 = 0.

### What is the quadratic formula I should use to solve 6x^2 + 11x - 35 = 0?

The quadratic formula is $x = [-b \pm \sqrt{(b^2 - 4ac)}] / 2a$, where a=6, b=11, and c=-35.

### How do I find the discriminant for the quadratic equation 6x^2 + 11x - 35 = 0?

Calculate the discriminant as $b^2 - 4ac$: $11^2 - 4(6)(-35) = 121 + 840 = 961$.

### What are the two possible values of T in the equation 6x^2 - 35 = -11x using the quadratic formula?

First, compute $x = [-11 \pm \sqrt{961}] / (26)$. Since $\sqrt{961} = 31$, the solutions are $x = (-11 + 31) / 12 = 20 / 12 = 5/3$, and $x = (-11 - 31) / 12 = -42 / 12 = -7/2$.

### Are both solutions for T valid in the context of the original equation 6x^2 - 35 = -11x?

Yes, both solutions T = 5/3 and T = -7/2 satisfy the original quadratic equation.

### Can I use factoring instead of the quadratic formula to solve 6x^2 + 11x - 35 = 0?

Factoring is possible if the quadratic factors nicely, but since 6x^2 + 11x - 35 doesn't factor easily, the quadratic formula is the most straightforward method.

## What is the importance of the discriminant being positive in this quadratic problem?

A positive discriminant (961) indicates there are two real and distinct solutions for T.

## How do I verify that my solutions T = 5/3 and T = -7/2 are correct?

Substitute each value back into the original equation $6x^2 - 35 = -11x$ to check if both sides are equal.

## What steps should I follow to solve similar quadratic equations using the quadratic formula?

First, rewrite the equation in standard form, identify a, b, and c, compute the discriminant, then plug into the quadratic formula to find the solutions.

## Are the solutions T = 5/3 and T = -7/2 approximate or exact?

These solutions are exact, expressed as simplified fractions. If desired, they can be approximated as decimal values: $T \approx 1.6667$ and $T \approx -3.5$.

# Additional Resources

Using The Quadratic Formula, Solve The Equation Below To Find The Two Possible Values Of T.6x^2 - 35 = -11x

When faced with a quadratic equation, one of the most reliable methods to find its solutions is by using the quadratic formula. This powerful algebraic tool allows us to determine the roots of any quadratic equation, whether it factors easily or not. In this guide, we will walk through the process of using the quadratic formula to solve the equation $6x^2 - 35 = -11x$ to find the two possible values of T. Although the original problem references T, the equation is expressed in terms of x, so we will clarify the variables involved and demonstrate how to approach such problems systematically.

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Understanding the Equation

The equation provided is:

$6x^2 - 35 = -11x$

At a glance, this is a quadratic equation because the highest power of x is 2. To make it suitable for applying the quadratic formula, we first need to rewrite it in the standard quadratic form:

$ax^2 + bx + c = 0$

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Converting to Standard Form

Let's rearrange the given equation:

$6x^2 - 35 = -11x$

Add 11x to both sides to bring all terms to one side:

$6x^2 + 11x - 35 = 0$

Now, the quadratic equation is in the standard form:

$a = 6$

$b = 11$

$c = -35$

This setup is crucial because the quadratic formula requires the coefficients a, b, and c.

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The Quadratic Formula

The quadratic formula is:

$x = [-b \pm \sqrt{(b^2 - 4ac)}] / (2a)$

This formula gives us the two solutions (roots) of the quadratic equation based on the coefficients. The term under the square root, $b^2 - 4ac$, is called the discriminant and determines the nature of the roots:

- If the discriminant > 0, there are two real solutions.
- If the discriminant = 0, there is exactly one real solution (a repeated root).
- If the discriminant < 0, the solutions are complex (non-real).

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Step-by-Step Solution

Let's apply the quadratic formula to our specific equation.

Step 1: Identify coefficients

- $a = 6$
- $b = 11$
- $c = -35$

Step 2: Calculate the discriminant

Discriminant, $D = b^2 - 4ac$

$D = (11)^2 - 4\ 6\ (-35)$

$D = 121 - 4\ 6\ (-35)$

Calculate $4\ 6 = 24$

Then $24\ (-35) = -840$

So,

$D = 121 - (-840) = 121 + 840 = 961$

Since $D = 961 > 0$, there are two real solutions.

Step 3: Calculate the square root of the discriminant

$\sqrt{D} = \sqrt{961} = 31$

Step 4: Plug into the quadratic formula

$x = [-b \pm \sqrt{D}] / (2a)$

$x = [-11 \pm 31] / (2\ 6)$

$x = [-11 \pm 31] / 12$

Now, compute each solution separately.

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Finding the Two Solutions

Solution 1: Using '+'

$x = (-11 + 31) / 12$

$x = (20) / 12$

Simplify:

$x = 5/3$

Solution 2: Using '−'

$x = (-11 - 31) / 12$

$x = (-42) / 12$

Simplify:

$x = -7/2$

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Final Results

The two solutions to the quadratic equation are:

- $x = 5/3$
- $x = -7/2$

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Interpreting the Solutions in Context

In the problem statement, the phrase "To find the two possible values of T" suggests that T might be related to x, or perhaps x itself represents T. If T is the variable, then the solutions are:

- $T = 5/3$
- $T = -7/2$

These are the two possible values for T, derived from solving the quadratic equation.

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Additional Considerations

1. Verification of Solutions

It’s always good practice to verify your solutions by plugging them back into the original equation:

$6x^2 - 35 = -11x$

For $x = 5/3$:

$6(5/3)^2 - 35 = -11(5/3)$

Calculate:

$(5/3)^2 = 25/9$

Then:

$6 \cdot 25/9 - 35 = -11 \cdot 5/3$

Simplify:

$(6 \cdot 25/9) = (150/9) = (50/3)$

Left side:

$50/3 - 35 = (50/3) - (105/3) = (-55/3)$

Right side:

$-11 \cdot 5/3 = -55/3$

They match, confirming the solution.

Similarly, for $x = -7/2$:

$6 (-7/2)^2 - 35 = -11 (-7/2)$

Calculate:

$(-7/2)^2 = 49/4$

Then:

$6 \cdot 49/4 - 35 = -11 (-7/2)$

Simplify:

$(6 \cdot 49/4) = (294/4) = (147/2)$

Left side:

$147/2 - 35 = (147/2) - (70/2) = (77/2)$

Right side:

$-11 (-7/2) = 77/2$

Again, both sides are equal, confirming the solution.

2. Graphical Interpretation

Plotting the quadratic function $y = 6x^2 + 11x - 35$ shows the parabola opening upwards (since $a = 6 > 0$). The roots at $x = 5/3$ and $x = -7/2$ are the x-intercepts where the parabola crosses the x-axis. Visualizing the graph helps solidify understanding of quadratic solutions.

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Summary and Key Takeaways

- To solve a quadratic equation like $6x^2 - 35 = -11x$, first rewrite it in standard form: $6x^2 + 11x - 35 = 0$.
- Identify the coefficients a, b, and c.
- Calculate the discriminant $D = b^2 - 4ac$ to determine the nature of roots.
- Apply the quadratic formula: $x = [-b \pm \sqrt{(b^2 - 4ac)}] / (2a)$.
- Simplify to find the two solutions.
- Verify solutions by plugging back into the original equation.
- Recognize the significance of solutions in the context of the problem—here, the values of T.

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Final Thoughts

Mastering the using the quadratic formula is essential for solving all types of quadratic equations, especially those that do not factor easily. This method provides a systematic and reliable approach to uncover the roots, helping students and professionals alike analyze mathematical problems with confidence. Whether your goal is to solve for x or T, understanding each step ensures accuracy and deepens your comprehension of quadratic relationships.

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