

Module 6: Solving Quadratic Equations

Topic 2: Using the Quadratic Formula to Solve Quadratic Equations

Introduction



Today's Lesson

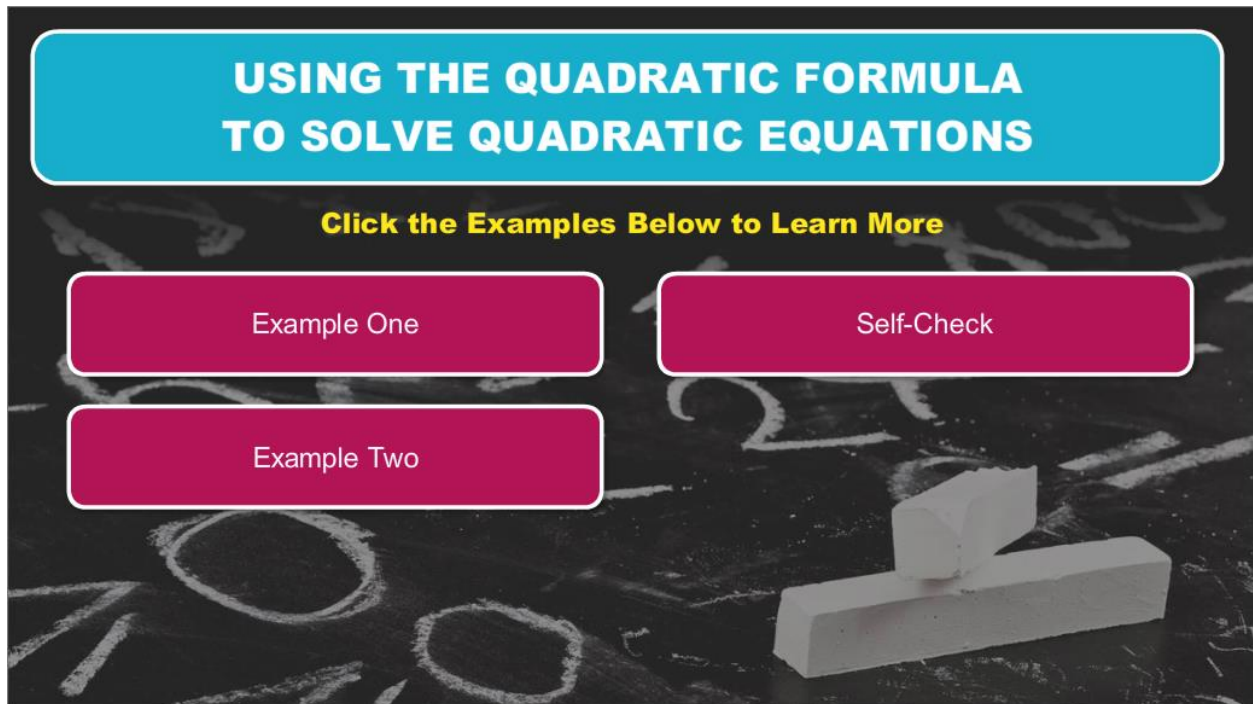
- You will learn how to use the quadratic formula to solve quadratic equations.

Hi there! I'm so glad you could join me for this lesson in Algebra I, where you will learn how to use the quadratic formula to solve quadratic equations.

Module 6: Solving Quadratic Equations

Topic 2: Using the Quadratic Formula to Solve Quadratic Equations

Using the Quadratic Formula to Solve Quadratic Equations



**USING THE QUADRATIC FORMULA
TO SOLVE QUADRATIC EQUATIONS**

Click the Examples Below to Learn More

Example One

Self-Check

Example Two

Click the examples below to learn more.

- Example One
- Example Two
- Self-Check

Module 6: Solving Quadratic Equations
Topic 2: Using the Quadratic Formula to Solve Quadratic Equations

Example 1

Example 1

Use the quadratic formula to solve the equation below.
 Approximate the solutions to the nearest hundredth.

$$7x^2 + 2x = 1$$

$$\begin{array}{r} -1 \quad -1 \\ \hline 7x^2 + 2x - 1 = 0 \end{array}$$

The Quadratic Formula

If $ax^2 + bx + c = 0$ and $a \neq 0$, then $x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$.

Use the quadratic formula to solve the equation below. Approximate the solutions to the nearest hundredth.

$$7x^2 + 2x = 1$$

$$7x^2 + 2x = 1$$

$$\begin{array}{r} -1 \quad -1 \\ \hline 7x^2 + 2x - 1 = 0 \end{array}$$

Before you are able to use the quadratic formula, you must represent the given equation in standard form. In this case, you will need to subtract 1 from each side of the equation. The result is $7x^2 + 2x - 1 = 0$.

The Quadratic Formula

If $ax^2 + bx + c = 0$ and $a \neq 0$, then

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

Now that the quadratic equation is in standard form, you can begin to use the quadratic formula to determine the solutions. The quadratic formula states that if $ax^2 + bx + c = 0$ and $a \neq 0$,

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

Module 6: Solving Quadratic Equations

Topic 2: Using the Quadratic Formula to Solve Quadratic Equations

Example 1 (continued)

Example 1

Use the quadratic formula to solve the equation below.
Approximate the solutions to the nearest hundredth.

$$ax^2 + bx + c = 0$$
$$7x^2 + 2x + (-1) = 0$$

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

The Quadratic Formula

If $ax^2 + bx + c = 0$ and $a \neq 0$, then $x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$.

Use the quadratic formula to solve the equation below. Approximate the solutions to the nearest hundredth.

$$7x^2 + 2x = 1$$

$$ax^2 + bx + c = 0$$
$$7x^2 + 2x + (-1) = 0$$

In the given equation, $a = 7$, $b = 2$, and $c = -1$.
Substitute these values in the quadratic formula.

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

$$x = \frac{-(2) \pm \sqrt{(2)^2 - 4(7)(-1)}}{2(7)}$$

Module 6: Solving Quadratic Equations

Topic 2: Using the Quadratic Formula to Solve Quadratic Equations

Example 1 (continued)

Example 1

Use the quadratic formula to solve the equation below.
Approximate the solutions to the nearest hundredth.

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

$$7x^2 + 2x + (-1) = 0$$

$$x = \frac{-(2) \pm \sqrt{(2)^2 - 4(7)(-1)}}{2(7)}$$

$$x = \frac{-2 \pm \sqrt{4 - (-28)}}{14}$$

Use the quadratic formula to solve the equation below. Approximate the solutions to the nearest hundredth.

$$7x^2 + 2x = 1$$

$$x = \frac{-(2) \pm \sqrt{(2)^2 - 4(7)(-1)}}{2(7)}$$

Now, begin to simplify the expression to the right of the equals sign. Start with the numerator. The opposite of 2 is -2 .

$$x = \frac{-2 \pm \sqrt{4 - (-28)}}{14}$$

$$2^2 = 4$$

$$4(7)(-1) = -28$$

Next, simplify the product in the denominator.

$$2(7) = 14$$

Module 6: Solving Quadratic Equations

Topic 2: Using the Quadratic Formula to Solve Quadratic Equations

Example 1 (continued)

Example 1

Use the quadratic formula to solve the equation below.
Approximate the solutions to the nearest hundredth.

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

$$7x^2 + 2x + (-1) = 0$$

$$x = \frac{-(2) \pm \sqrt{(2)^2 - 4(7)(-1)}}{2(7)}$$

$$x = \frac{-2 \pm \sqrt{32}}{14}$$

Use the quadratic formula to solve the equation below. Approximate the solutions to the nearest hundredth.

$$7x^2 + 2x = 1$$

$$x = \frac{-2 \pm \sqrt{4 - (-28)}}{14}$$

Now, simplify the expression underneath the radical symbol.

$$x = \frac{-2 \pm \sqrt{32}}{14}$$

$$4 - (-28) = 32$$

You are one step closer to determining the solutions.

Module 6: Solving Quadratic Equations

Topic 2: Using the Quadratic Formula to Solve Quadratic Equations

Example 1 (continued)

Example 1

Use the quadratic formula to solve the equation below.
Approximate the solutions to the nearest hundredth.

$$x = \frac{-2 \pm \sqrt{32}}{14}$$

$$x = \frac{-2 + \sqrt{32}}{14}$$

Use the quadratic formula to solve the equation below. Approximate the solutions to the nearest hundredth.

$$7x^2 + 2x = 1$$

$$x = \frac{-2 \pm \sqrt{32}}{14}$$

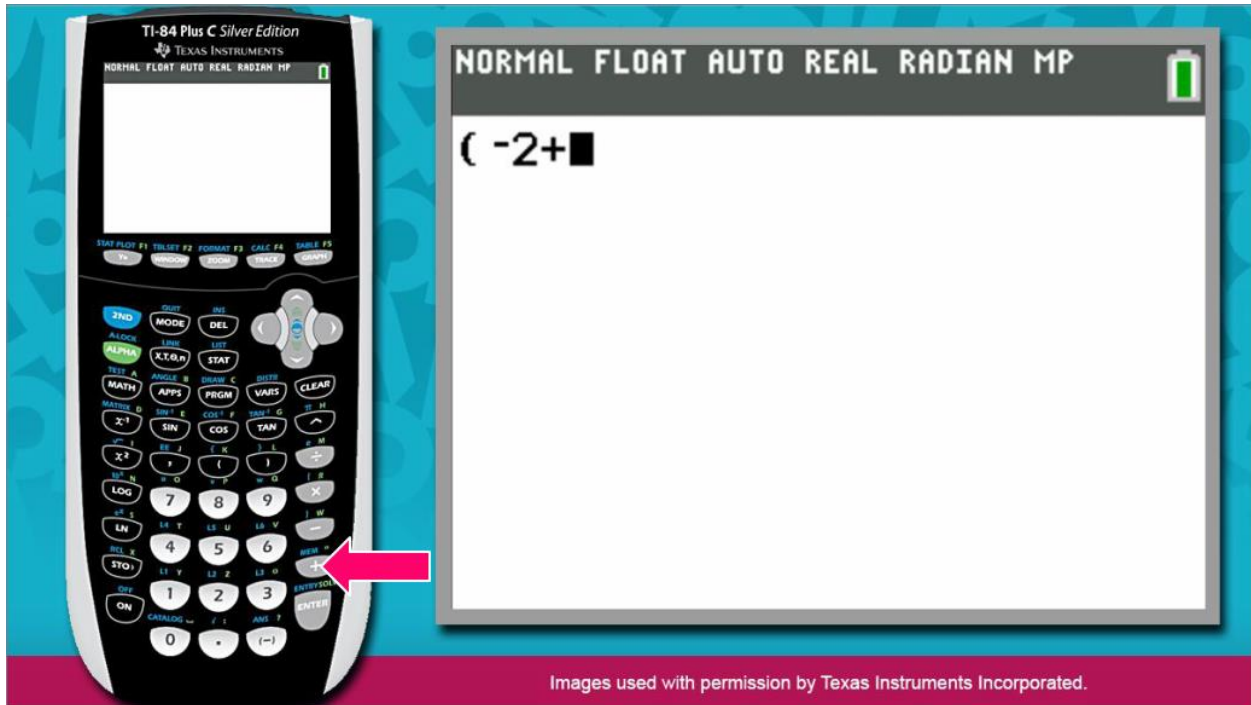
$$x = \frac{-2 + \sqrt{32}}{14}$$

There are two solutions to the quadratic equation. One of the solutions is $x = \frac{-2 + \sqrt{32}}{14}$. Because 32 is not a perfect square, you may want to use the calculator to simplify the expression to the right of equals sign.

Module 6: Solving Quadratic Equations

Topic 2: Using the Quadratic Formula to Solve Quadratic Equations

Example 1 (continued)

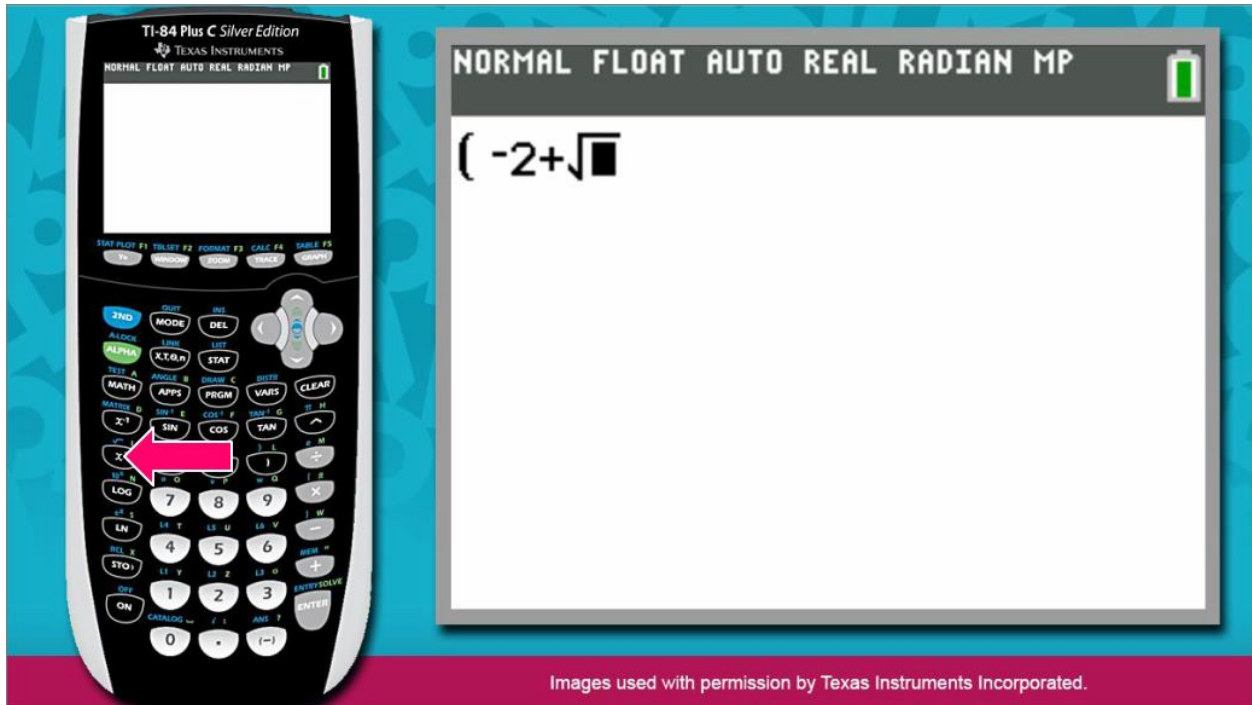


Recall the order of operations. You must simplify the expression in numerator before dividing by 14. To guarantee that the order of operations is followed, include parentheses around the expression in the numerator. Press the left parenthesis key, located above the 8 key. Press the negative key, then press the 2 key, and then the addition key.

Module 6: Solving Quadratic Equations

Topic 2: Using the Quadratic Formula to Solve Quadratic Equations

Example 1 (continued)



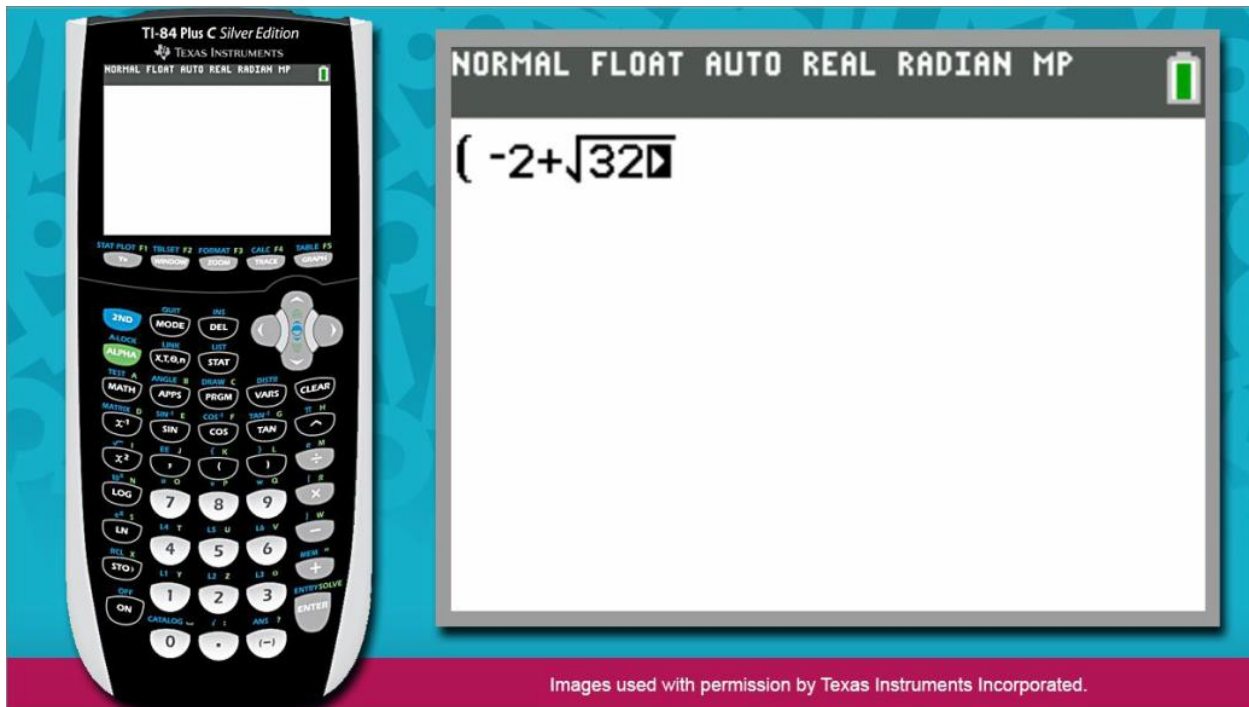
To access the square root function, press the 2nd key, the blue key located near the top left corner of the keys. Pressing this key informs the calculator that you want to perform one of the functions stamped above a calculator key.

Now, press the x^2 key, located above and to the left of the 7 key.

Module 6: Solving Quadratic Equations

Topic 2: Using the Quadratic Formula to Solve Quadratic Equations

Example 1 (continued)

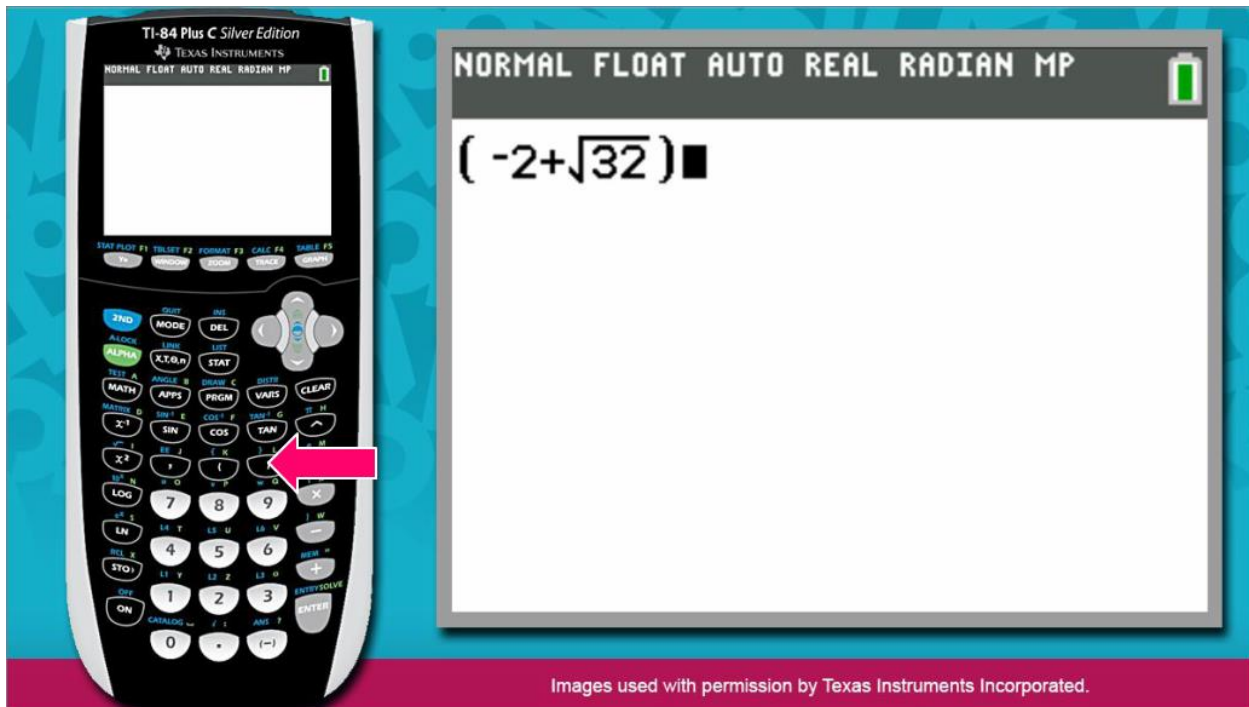


Next press the 3 key and then the 2 key. Notice that the cursor changes to a right arrow. This is the calculator's way of alerting you to press the right arrow key if you have finished entering the value to be included within the square root symbol.

Module 6: Solving Quadratic Equations

Topic 2: Using the Quadratic Formula to Solve Quadratic Equations

Example 1 (continued)

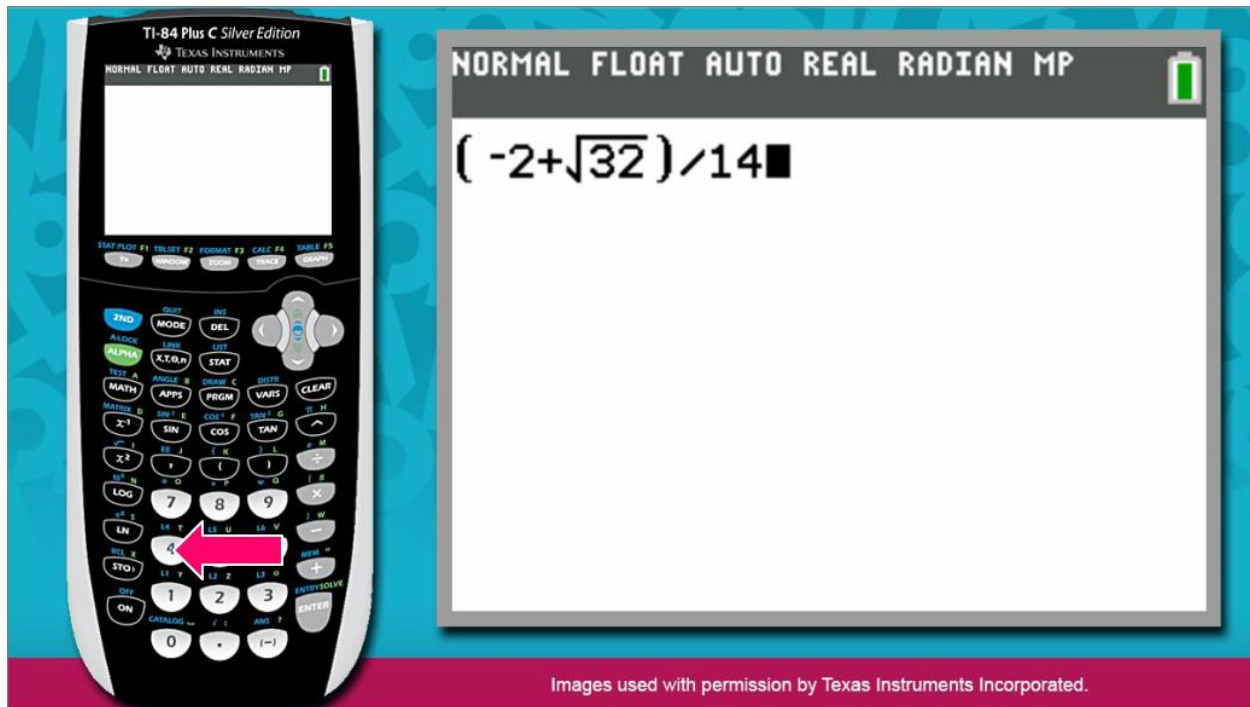


Because you have finished entering the value, press the right arrow key. You will notice the cursor move to the right of the expression. Next, press the right parenthesis key, located above the 9 key.

Module 6: Solving Quadratic Equations

Topic 2: Using the Quadratic Formula to Solve Quadratic Equations

Example 1 (continued)

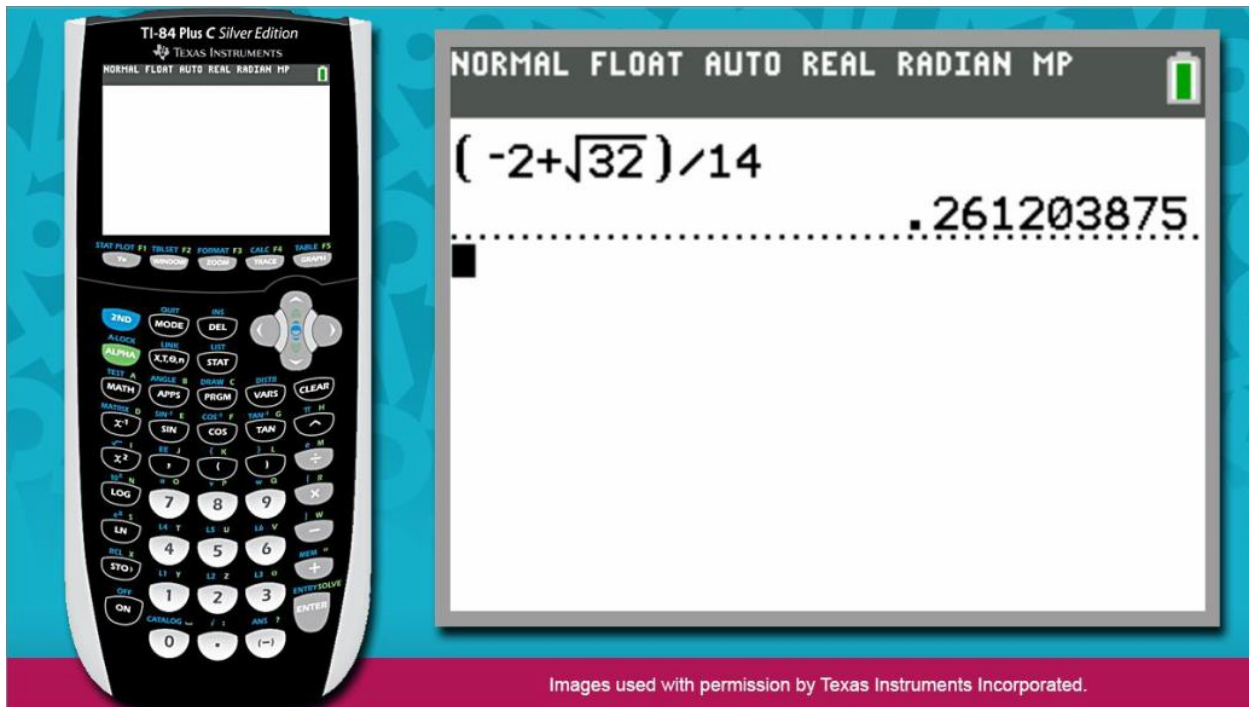


Now, press the division key. Then press the 1 key, and then the 4 key.

Module 6: Solving Quadratic Equations

Topic 2: Using the Quadratic Formula to Solve Quadratic Equations

Example 1 (continued)



Now, press enter. In this example, you were asked to approximate the solutions to the nearest hundredth. So, this solution can be represented as 0.26.

Module 6: Solving Quadratic Equations

Topic 2: Using the Quadratic Formula to Solve Quadratic Equations

Example 1 (continued)

Example 1

Use the quadratic formula to solve the equation below.
Approximate the solutions to the nearest hundredth.

$$x = \frac{-2 \pm \sqrt{32}}{14}$$

$$x = \frac{-2 + \sqrt{32}}{14} \approx 0.26 \quad x = \frac{-2 - \sqrt{32}}{14}$$

Use the quadratic formula to solve the equation below. Approximate the solutions to the nearest hundredth.

$$7x^2 + 2x = 1$$

$$x = \frac{-2 \pm \sqrt{32}}{14}$$

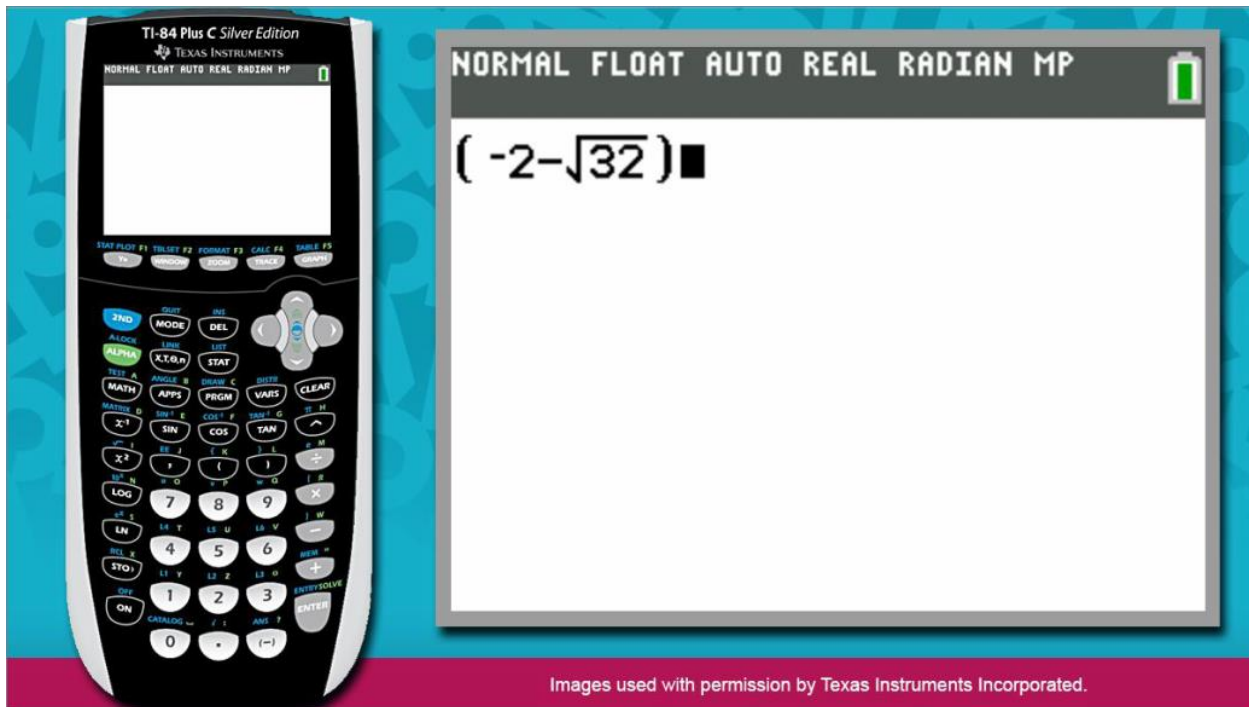
$$x = \frac{-2 + \sqrt{32}}{14} \approx 0.26 \quad x = \frac{-2 - \sqrt{32}}{14}$$

Now that you know one of the solutions is approximately 0.26, you can move on to determine the second solution, where $x = \frac{-2 - \sqrt{32}}{14}$. Again, you may want to use the calculator to determine this value.

Module 6: Solving Quadratic Equations

Topic 2: Using the Quadratic Formula to Solve Quadratic Equations

Example 1 (continued)

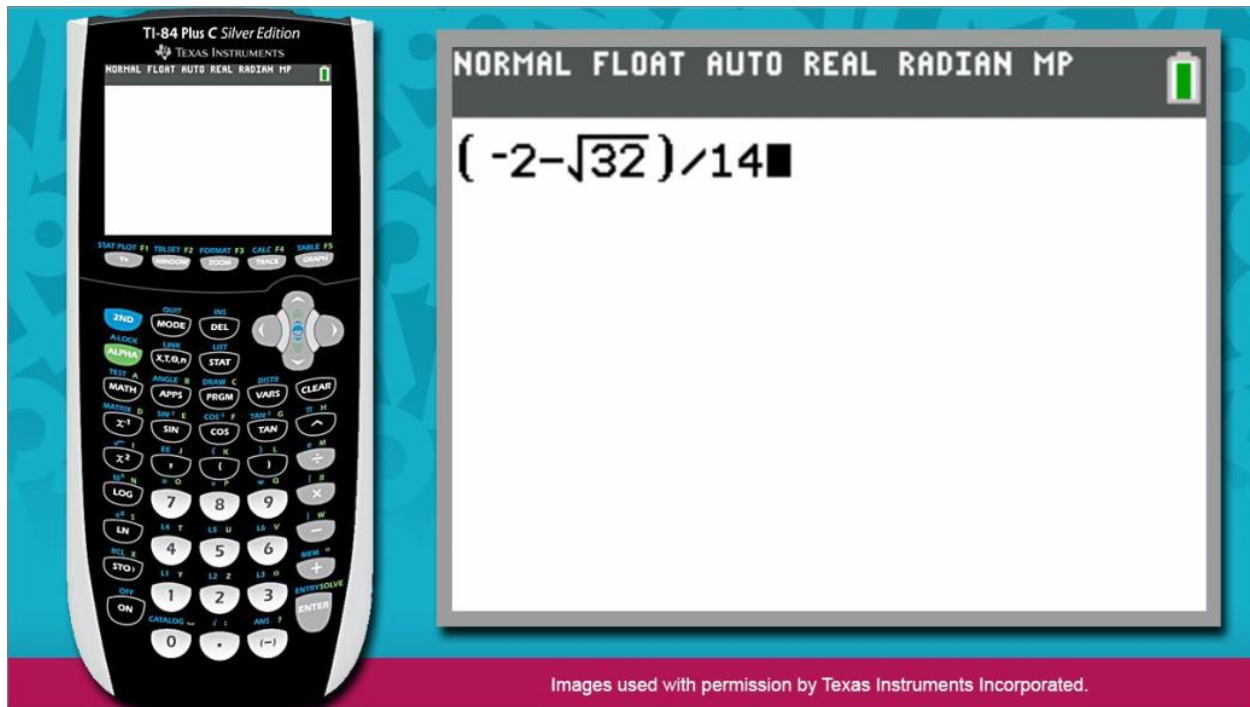


Remember to place parentheses around the expression in the numerator.

Module 6: Solving Quadratic Equations

Topic 2: Using the Quadratic Formula to Solve Quadratic Equations

Example 1 (continued)

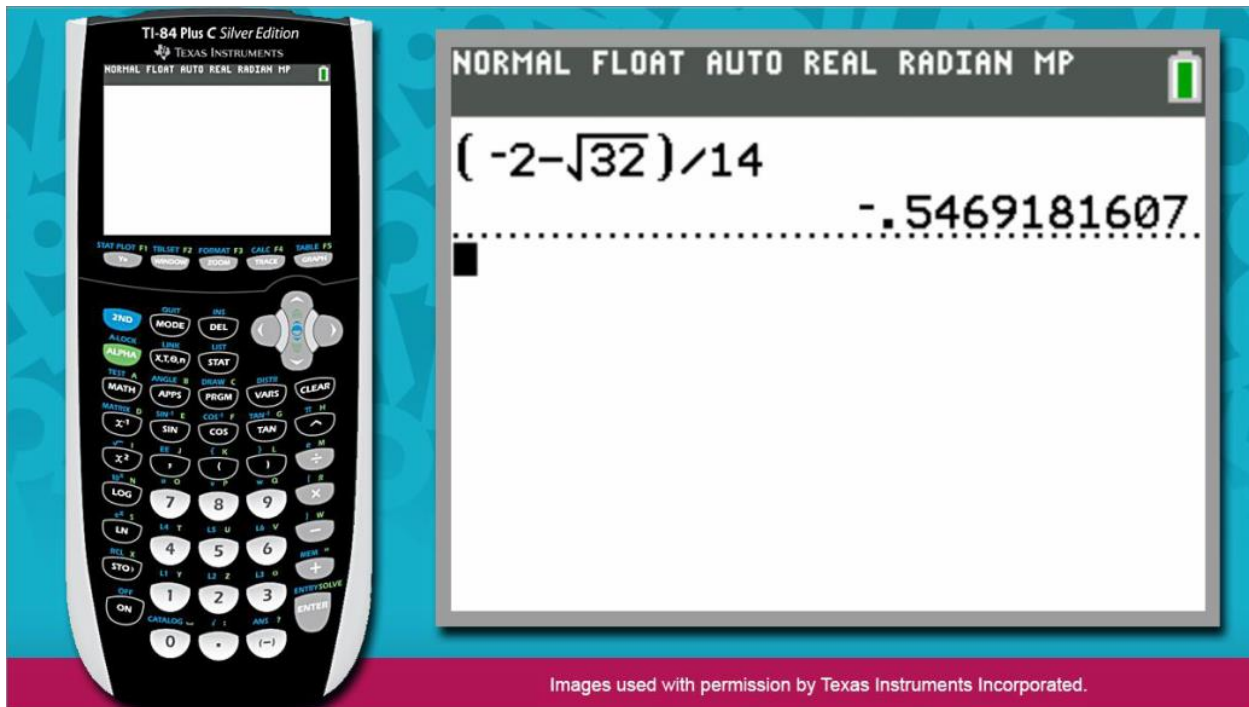


Then, divide the expression by 14.

Module 6: Solving Quadratic Equations

Topic 2: Using the Quadratic Formula to Solve Quadratic Equations

Example 1 (continued)



After pressing ENTER, you are able to determine the solution. Remember that in this example you were asked to approximate the solutions to the nearest hundredth. So, this solution can be represented as -0.55 .

Module 6: Solving Quadratic Equations

Topic 2: Using the Quadratic Formula to Solve Quadratic Equations

Example 1 (continued)

Example 1

Use the quadratic formula to solve the equation below.
Approximate the solutions to the nearest hundredth.

$$x = \frac{-2 \pm \sqrt{32}}{14}$$

$$x = \frac{-2 + \sqrt{32}}{14} \approx 0.26 \quad x = \frac{-2 - \sqrt{32}}{14} \approx -0.55$$

$$\{-0.55, 0.26\}$$

Use the quadratic formula to solve the equation below. Approximate the solutions to the nearest hundredth.

$$7x^2 + 2x = 1$$

$$x = \frac{-2 \pm \sqrt{32}}{14}$$

You have determined both solutions to the quadratic equation. The solutions can be represented using set notation.

$$x = \frac{-2 + \sqrt{32}}{14} \approx 0.26 \quad x = \frac{-2 - \sqrt{32}}{14} \approx -0.55$$

$$\{-0.55, 0.26\}$$

Module 6: Solving Quadratic Equations
Topic 2: Using the Quadratic Formula to Solve Quadratic Equations

Example 2

Example 2

Solve the following quadratic equation: $2x^2 = 3x + 5$

Which of the following equations is equivalent to the given quadratic equation?

$2x^2 - 3x - 5 = 0$

$2x^2 + 3x + 5 = 0$

$2x^2 - 3x + 5 = 0$

Solve the following quadratic equation:

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

Before you are able to use the quadratic formula you must represent the given equation in standard form.

Which of the following correctly models the given quadratic equation in standard form?

- A) $2x^2 - 3x - 5 = 0$
- B) $2x^2 + 3x + 5 = 0$
- C) $2x^2 - 3x + 5 = 0$

Module 6: Solving Quadratic Equations

Topic 2: Using the Quadratic Formula to Solve Quadratic Equations

Example 2 (continued)

Example 2

Solve the following quadratic equation: $2x^2 = 3x + 5$

$2x^2 - 3x - 5 = 0$ is equivalent to the given quadratic equation.

$$2x^2 - 3x - 5 = 0$$

[View Work](#)

[Next](#)

Solve the following quadratic equation:

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

$2x^2 - 3x - 5 = 0$ is equivalent to the given quadratic equation.

Module 6: Solving Quadratic Equations

Topic 2: Using the Quadratic Formula to Solve Quadratic Equations

Example 2 (continued)

Example 2

Solve the following quadratic equation: $2x^2 = 3x + 5$

$$\begin{array}{r} 2x^2 = 3x + 5 \\ -3x \quad -3x \\ \hline \end{array}$$

To represent the quadratic equation in standard form, you can begin by subtracting $3x$ from both sides.

$$2x^2 - 3x = 5$$

Then, subtract 5 from both sides of the equation.

$$\begin{array}{r} 2x^2 - 3x = 5 \\ -5 \quad -5 \\ \hline \end{array}$$

$$2x^2 - 3x - 5 = 0$$

Next

Solve the following quadratic equation:

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

$$\begin{array}{r} 2x^2 = 3x + 5 \\ -3x \quad -3x \\ \hline \end{array}$$

To represent the quadratic equation in standard form, you can begin by subtracting $3x$ from both sides.

$$2x^2 - 3x = 5$$

Then, subtract 5 from both sides of the equation.

$$2x^2 - 3x = 5$$

$$\begin{array}{r} 2x^2 - 3x = 5 \\ -5 \quad -5 \\ \hline \end{array}$$

$$2x^2 - 3x - 5 = 0$$

The correct answer is B.

Module 6: Solving Quadratic Equations

Topic 2: Using the Quadratic Formula to Solve Quadratic Equations

Example 2 (continued)

Example 2

Solve the following quadratic equation: $2x^2 = 3x + 5$

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

$$2x^2 - 3x - 5 = 0$$

Enter the appropriate values for a , b , and c . Then, click submit.

$$a = \boxed{} \quad b = \boxed{} \quad c = \boxed{}$$

Submit

Solve the following quadratic equation:

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

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

$$2x^2 - 3x - 5 = 0$$

Now that the quadratic equation is in standard form, you can begin to use the quadratic formula.

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

Start by identifying a , b , and c .

Enter the appropriate values for a , b , and c . Then, click submit.

$$a = __? __ \quad b = __? __ \quad c = __? __$$

Module 6: Solving Quadratic Equations

Topic 2: Using the Quadratic Formula to Solve Quadratic Equations

Example 2 (continued)

Example 2

Solve the following quadratic equation: $2x^2 = 3x + 5$

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

$$2x^2 + (-3)x + (-5) = 0$$

The appropriate values for a , b , and c are as follows:

$$a = 2$$

$$b = -3$$

$$c = -5$$

Next

Solve the following quadratic equation:

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

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

$$2x^2 + (-3)x + (-5) = 0$$

The appropriate values for a , b , and c are as follows.

$$a = 2$$

$$b = -3$$

$$c = -5$$

Module 6: Solving Quadratic Equations

Topic 2: Using the Quadratic Formula to Solve Quadratic Equations

Example 2 (continued)

Example 2

Solve the following quadratic equation: $2x^2 = 3x + 5$

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

$$2x^2 + (-3)x + (-5) = 0$$

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

Substitute the appropriate values into the quadratic formula.

$$x = \frac{-(\square) \pm \sqrt{(\square)^2 - 4(\square)(\square)}}{2(\square)}$$

Submit

Solve the following quadratic equation:

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

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

$$2x^2 + (-3)x + (-5) = 0$$

Now that you have found that $a = 2$, $b = -3$, $c = -5$, substitute the values into the quadratic formula.

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

Substitute the appropriate values into the quadratic formula.

$$x = \frac{-(?) \pm \sqrt{(?)^2 - 4(?)(?)}}{2(?)}$$

Module 6: Solving Quadratic Equations

Topic 2: Using the Quadratic Formula to Solve Quadratic Equations

Example 2 (continued)

Example 2

Solve the following quadratic equation: $2x^2 = 3x + 5$

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

$$2x^2 + (-3)x + (-5) = 0$$

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

If $a = 2$, $b = -3$, and $c = -5$, then...

$$x = \frac{-(-3) \pm \sqrt{(-3)^2 - 4(2)(-5)}}{2(2)}$$

Next

Solve the following quadratic equation:

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

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

$$2x^2 + (-3)x + (-5) = 0$$

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

$$\text{If } a = 2, b = -3, c = -5, \text{ then } x = \frac{-(-3) \pm \sqrt{(-3)^2 - 4(2)(-5)}}{2(2)}$$

Module 6: Solving Quadratic Equations

Topic 2: Using the Quadratic Formula to Solve Quadratic Equations

Example 2 (continued)

Example 2

Solve the following quadratic equation: $2x^2 = 3x + 5$

$$x = \frac{-(-3) \pm \sqrt{(-3)^2 - 4(2)(-5)}}{2(2)}$$

$$x = \frac{3 \pm \sqrt{9 - (-40)}}{4}$$

The work shown above is correct.

True

False

Solve the following quadratic equation:

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

$$x = \frac{-(-3) \pm \sqrt{(-3)^2 - 4(2)(-5)}}{2(2)}$$

$$x = \frac{3 \pm \sqrt{9 - (-40)}}{4}$$

The work shown above is correct.

- A) True
- B) False

Module 6: Solving Quadratic Equations

Topic 2: Using the Quadratic Formula to Solve Quadratic Equations

Example 2 (continued)

Example 2

Solve the following quadratic equation: $2x^2 = 3x + 5$

$$x = \frac{-(-3) \pm \sqrt{(-3)^2 - 4(2)(-5)}}{2(2)}$$

$$x = \frac{3 \pm \sqrt{9 - (-40)}}{4}$$

Use the color coding as a guide to verify the work above.

True

Next

Solve the following quadratic equation:

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

$$x = \frac{-(-3) \pm \sqrt{(-3)^2 - 4(2)(-5)}}{2(2)}$$

$$x = \frac{3 \pm \sqrt{9 - (-40)}}{4}$$

Use the color coding as a guide to verify the work above.

Module 6: Solving Quadratic Equations

Topic 2: Using the Quadratic Formula to Solve Quadratic Equations

Example 2 (continued)

Example 2

Solve the following quadratic equation: $2x^2 = 3x + 5$

$$x = \frac{3 \pm \sqrt{9 - (-40)}}{4}$$

$$x = \frac{3 \pm \sqrt{\square}}{4}$$

What is the value that results from simplifying the expression underneath the radical symbol?
Enter the correct value and click submit.

Submit

Solve the following quadratic equation:

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

Simplify the expression underneath the radical symbol.

$$x = \frac{3 \pm \sqrt{9 - (-40)}}{4}$$

$$x = \frac{3 \pm \sqrt{?}}{4}$$

What is the value that results from simplifying the expression underneath the radical symbol? Enter the correct value and click submit.

Module 6: Solving Quadratic Equations

Topic 2: Using the Quadratic Formula to Solve Quadratic Equations

Example 2 (continued)

Example 2

Solve the following quadratic equation: $2x^2 = 3x + 5$

$$x = \frac{3 \pm \sqrt{9 - (-40)}}{4}$$

$$x = \frac{3 \pm \sqrt{49}}{4}$$

$9 - (-40) = 49$. Therefore, the expression underneath the radical symbol can simplify to 49.

Solve the following quadratic equation:

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

$$x = \frac{3 \pm \sqrt{9 - (-40)}}{4}$$

$$x = \frac{3 \pm \sqrt{49}}{4}$$

$9 - (-40) = 49$. Therefore, the expression underneath the radical symbol can simplify to 49.

Module 6: Solving Quadratic Equations

Topic 2: Using the Quadratic Formula to Solve Quadratic Equations

Example 2 (continued)

Example 2

Solve the following quadratic equation: $2x^2 = 3x + 5$

$$x = \frac{3 \pm 7}{4}$$

Solve the following quadratic equation:

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

$$x = \frac{3 \pm \sqrt{49}}{4}$$

$$x = \frac{3 \pm 7}{4}$$

49 is a perfect square. So continue to simplify the expression by replacing the $\sqrt{49}$ with 7.

Module 6: Solving Quadratic Equations

Topic 2: Using the Quadratic Formula to Solve Quadratic Equations

Example 2 (continued)

Example 2

Solve the following quadratic equation: $2x^2 = 3x + 5$

$$x = \frac{3 \pm 7}{4}$$

$$x = \frac{3 + 7}{4}$$

After simplifying the first expression, you find that x equals...

$$\frac{5}{2}$$

$$\frac{3}{4}$$

$$0$$

Solve the following quadratic equation:

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

$$x = \frac{3 \pm \sqrt{7}}{4}$$

The final step is to determine each solution.

$$x = \frac{3 + 7}{4}$$

After simplifying the first expression, you find that...

A) $\frac{5}{2}$

B) $\frac{3}{4}$

C) 0

Module 6: Solving Quadratic Equations

Topic 2: Using the Quadratic Formula to Solve Quadratic Equations

Example 2 (continued)

Example 2

Solve the following quadratic equation: $2x^2 = 3x + 5$

$$x = \frac{3 \pm 7}{4}$$

$$x = \frac{3 + 7}{4} = \frac{10}{4} = \frac{5}{2}$$

After simplifying the first expression, you find that $x = \frac{5}{2}$.

$$\frac{5}{2}$$

Next

Solve the following quadratic equation:

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

$$x = \frac{3 \pm \sqrt{7}}{4}$$

$$x = \frac{3+7}{4} = \frac{10}{4} = \frac{5}{2}$$

After simplifying the first expression, you find that $x = \frac{5}{2}$.

Module 6: Solving Quadratic Equations

Topic 2: Using the Quadratic Formula to Solve Quadratic Equations

Example 2 (continued)

Example 2

Solve the following quadratic equation: $2x^2 = 3x + 5$

$$x = \frac{3 \pm 7}{4}$$

$$x = \frac{3 + 7}{4} = \frac{10}{4} = \frac{5}{2} \quad x = \frac{3 - 7}{4}$$

After simplifying the second expression, you find that x equals...

0

-1

4

Solve the following quadratic equation:

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

$$x = \frac{3 \pm \sqrt{7}}{4}$$

$$x = \frac{3+7}{4} = \frac{10}{4} = \frac{5}{2} \quad x = \frac{3-7}{4}$$

After simplifying the second expression, you find that...

- A) 0
- B) -1
- C) 4

Module 6: Solving Quadratic Equations

Topic 2: Using the Quadratic Formula to Solve Quadratic Equations

Example 2 (continued)

Example 2

Solve the following quadratic equation: $2x^2 = 3x + 5$

$$x = \frac{3 \pm 7}{4}$$

$$x = \frac{3 + 7}{4} = \frac{10}{4} = \frac{5}{2} \quad x = \frac{3 - 7}{4} = \frac{-4}{4} = -1$$

After simplifying the second expression, you find that $x = -1$.

-1

Solve the following quadratic equation:

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

$$x = \frac{3 \pm \sqrt{7}}{4}$$

$$x = \frac{3+7}{4} = \frac{10}{4} = \frac{5}{2} \quad x = \frac{3-7}{4} = \frac{-4}{4} = -1$$

After simplifying the second expression, you find that $x = -1$.

Module 6: Solving Quadratic Equations

Topic 2: Using the Quadratic Formula to Solve Quadratic Equations

Example 2 (continued)

Example 2

Solve the following quadratic equation: $2x^2 = 3x + 5$

$$x = \frac{3 \pm 7}{4}$$

$$x = \frac{3 + 7}{4} = \frac{10}{4} = \frac{5}{2} \quad x = \frac{3 - 7}{4} = \frac{-4}{4} = -1$$

The solution set of the quadratic equation is

$$\left\{-1, \frac{5}{2}\right\}$$

Menu

Solve the following quadratic equation:

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

$$x = \frac{3 \pm \sqrt{7}}{4}$$

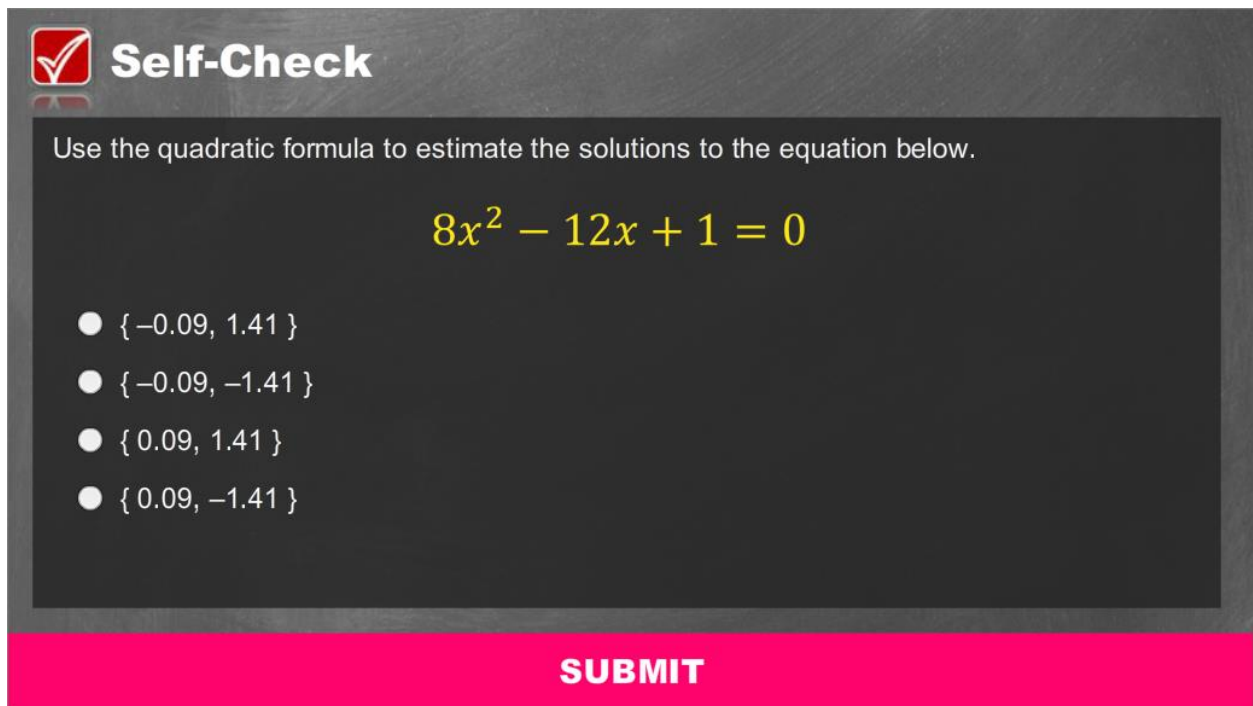
$$x = \frac{3+7}{4} = \frac{10}{4} = \frac{5}{2} \quad x = \frac{3-7}{4} = \frac{-4}{4} = -1$$

The solution set of the quadratic equation is $\left\{-1, \frac{5}{2}\right\}$.

Module 6: Solving Quadratic Equations

Topic 2: Using the Quadratic Formula to Solve Quadratic Equations

Self-Check

A self-check interface with a dark grey background. At the top left is a red checkmark icon in a square, followed by the text "Self-Check" in white. Below this is a dark grey rectangular area containing the text "Use the quadratic formula to estimate the solutions to the equation below." in white. The equation $8x^2 - 12x + 1 = 0$ is displayed in yellow. Below the equation are four radio button options, each with a white dot and white text: $\{-0.09, 1.41\}$, $\{-0.09, -1.41\}$, $\{0.09, 1.41\}$, and $\{0.09, -1.41\}$. At the bottom of the interface is a bright pink horizontal bar with the word "SUBMIT" in white capital letters.

Self-Check

Use the quadratic formula to estimate the solutions to the equation below.

$$8x^2 - 12x + 1 = 0$$

- $\{-0.09, 1.41\}$
- $\{-0.09, -1.41\}$
- $\{0.09, 1.41\}$
- $\{0.09, -1.41\}$

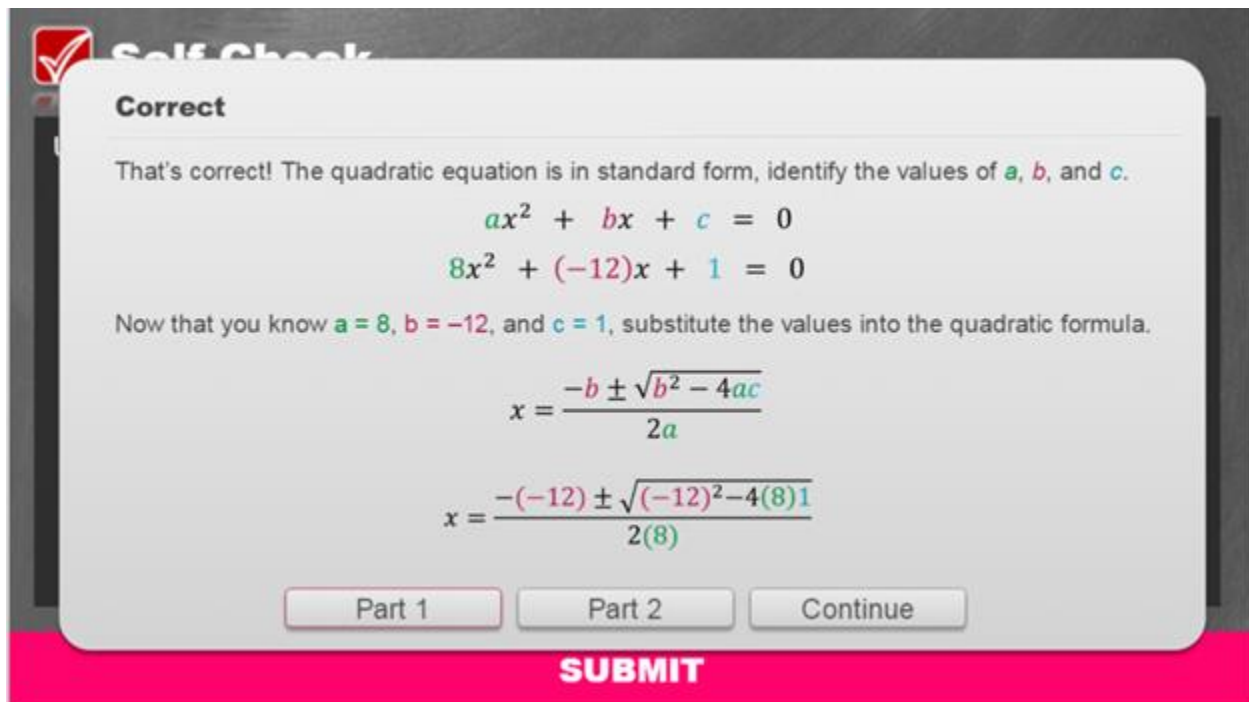
SUBMIT

Solve the problem in the image above to check your understanding of the content.

Module 6: Solving Quadratic Equations

Topic 2: Using the Quadratic Formula to Solve Quadratic Equations

Self-Check: Answer



Correct

That's correct! The quadratic equation is in standard form, identify the values of a , b , and c .

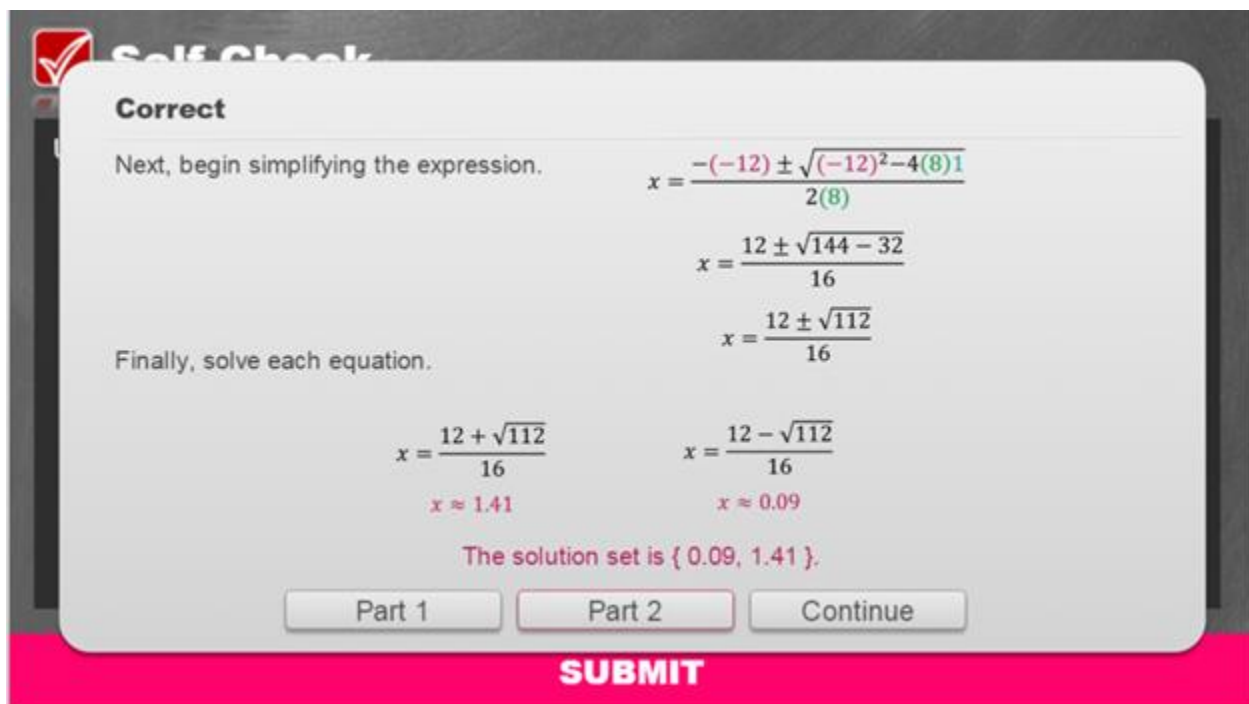
$$ax^2 + bx + c = 0$$
$$8x^2 + (-12)x + 1 = 0$$

Now that you know $a = 8$, $b = -12$, and $c = 1$, substitute the values into the quadratic formula.

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$
$$x = \frac{-(-12) \pm \sqrt{(-12)^2 - 4(8)1}}{2(8)}$$

Part 1 Part 2 Continue

SUBMIT



Correct

Next, begin simplifying the expression.

$$x = \frac{-(-12) \pm \sqrt{(-12)^2 - 4(8)1}}{2(8)}$$
$$x = \frac{12 \pm \sqrt{144 - 32}}{16}$$
$$x = \frac{12 \pm \sqrt{112}}{16}$$

Finally, solve each equation.

$$x = \frac{12 + \sqrt{112}}{16}$$
$$x \approx 1.41$$
$$x = \frac{12 - \sqrt{112}}{16}$$
$$x \approx 0.09$$

The solution set is $\{0.09, 1.41\}$.

Part 1 Part 2 Continue

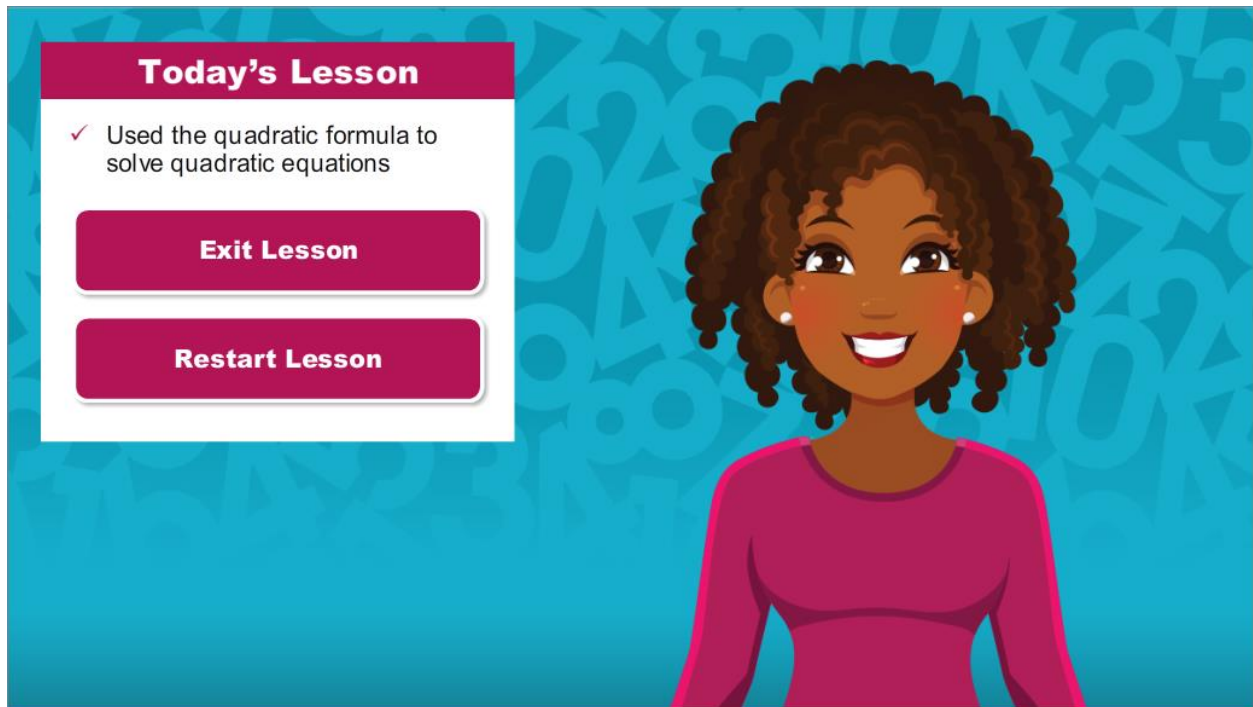
SUBMIT

For your reference, the images above show the correct solution to the self-check problem.

Module 6: Solving Quadratic Equations

Topic 2: Using the Quadratic Formula to Solve Quadratic Equations

Conclusion



The image shows a digital interface for a lesson conclusion. On the left, a white box with a pink header titled "Today's Lesson" contains a checkmark and the text "Used the quadratic formula to solve quadratic equations". Below this are two pink buttons: "Exit Lesson" and "Restart Lesson". To the right of the box is a cartoon illustration of a smiling woman with dark curly hair, wearing a pink long-sleeved top. The background is a teal color with a pattern of faint mathematical symbols like pi, infinity, and numbers.

You have reached the conclusion of this lesson, where you learned how to use the quadratic formula to solve quadratic equations.