

Module 3: Adding and Subtracting Polynomials
Topic 3 Content: Using Graphs to Verify Factors of a Polynomial

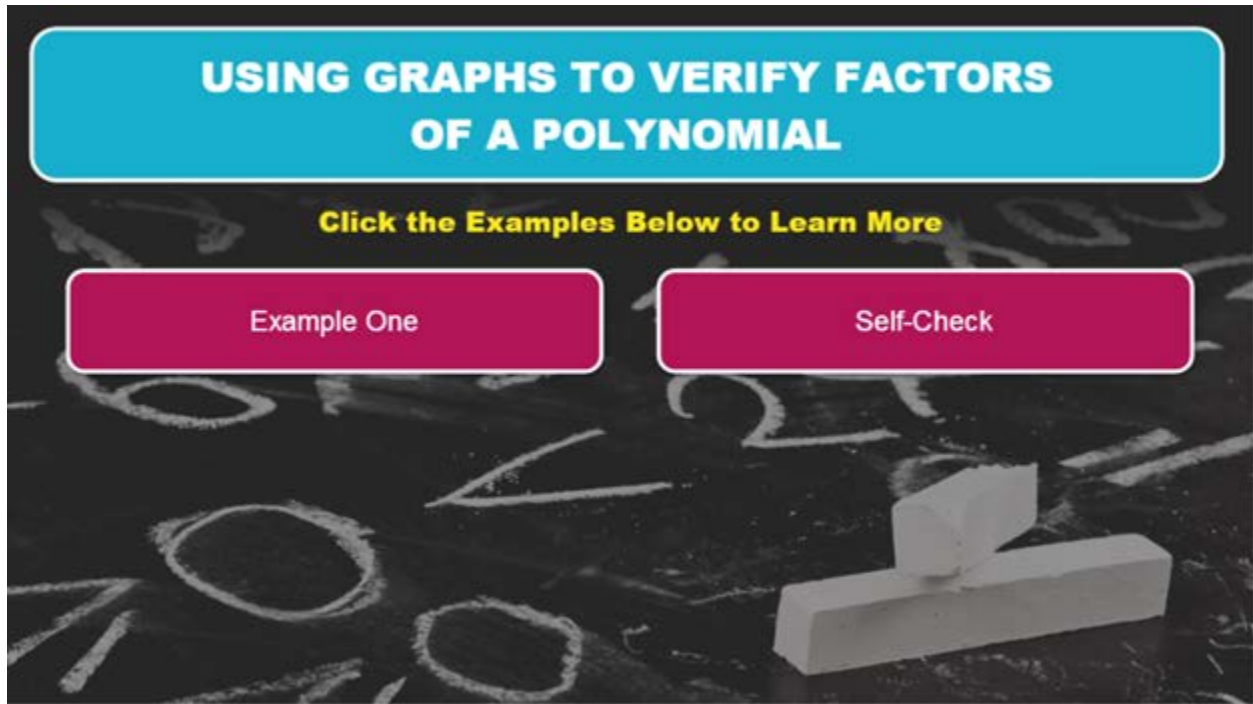
Introduction



Hello and welcome! I'm so glad you could join me for this lesson in Algebra I. In this lesson, you will learn how to use the graphing calculator to verify the factors of a polynomial.

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Using Graphs to Verify Factors of a Polynomial



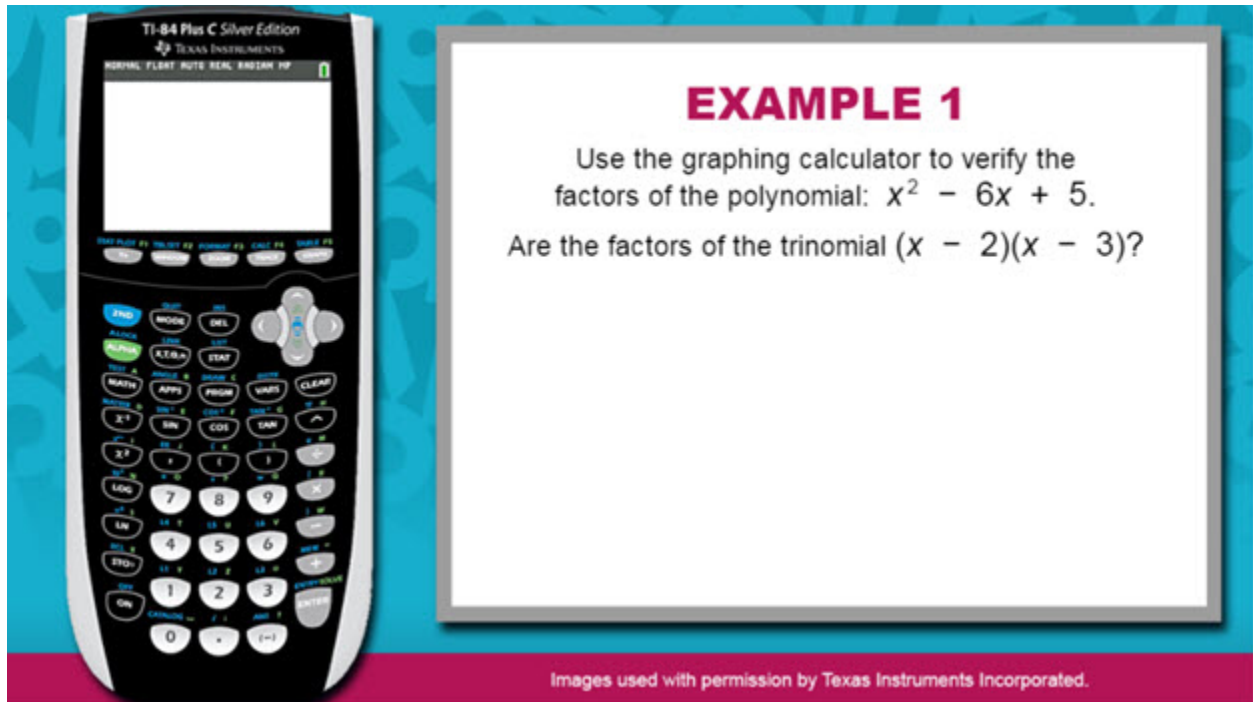
The graphic features a dark background with faint chalkboard-style drawings of circles and arrows. At the top, a blue rounded rectangle contains the title "USING GRAPHS TO VERIFY FACTORS OF A POLYNOMIAL" in white, bold, uppercase letters. Below this, a yellow text prompt reads "Click the Examples Below to Learn More". Two pink rounded rectangular buttons are positioned below the prompt: "Example One" on the left and "Self-Check" on the right. In the bottom right corner, there is a 3D rendering of a white rectangular prism with a smaller white rectangular prism attached to its top surface.

Click the examples below to learn more.

- Example One
- Self-Check

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Example 1



The image shows a TI-84 Plus C Silver Edition calculator on the left and a white text box on the right. The text box contains the following text:

EXAMPLE 1

Use the graphing calculator to verify the factors of the polynomial: $x^2 - 6x + 5$.
Are the factors of the trinomial $(x - 2)(x - 3)$?


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Use the graphing calculator to verify the factors of the polynomial: $x^2 - 6x + 5$.

Are the factors of the trinomial $(x - 2)$ and $(x - 3)$?

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Example 1 (continued)



EXAMPLE 1

Use the graphing calculator to verify the factors of the polynomial: $x^2 - 6x + 5$.
Are the factors of the trinomial $(x - 2)(x - 3)$?

Define the following function

$$y = x^2 - 6x + 5$$

to represent the given trinomial

$$y = (x - 2)(x - 3)$$

to represent the given factors.

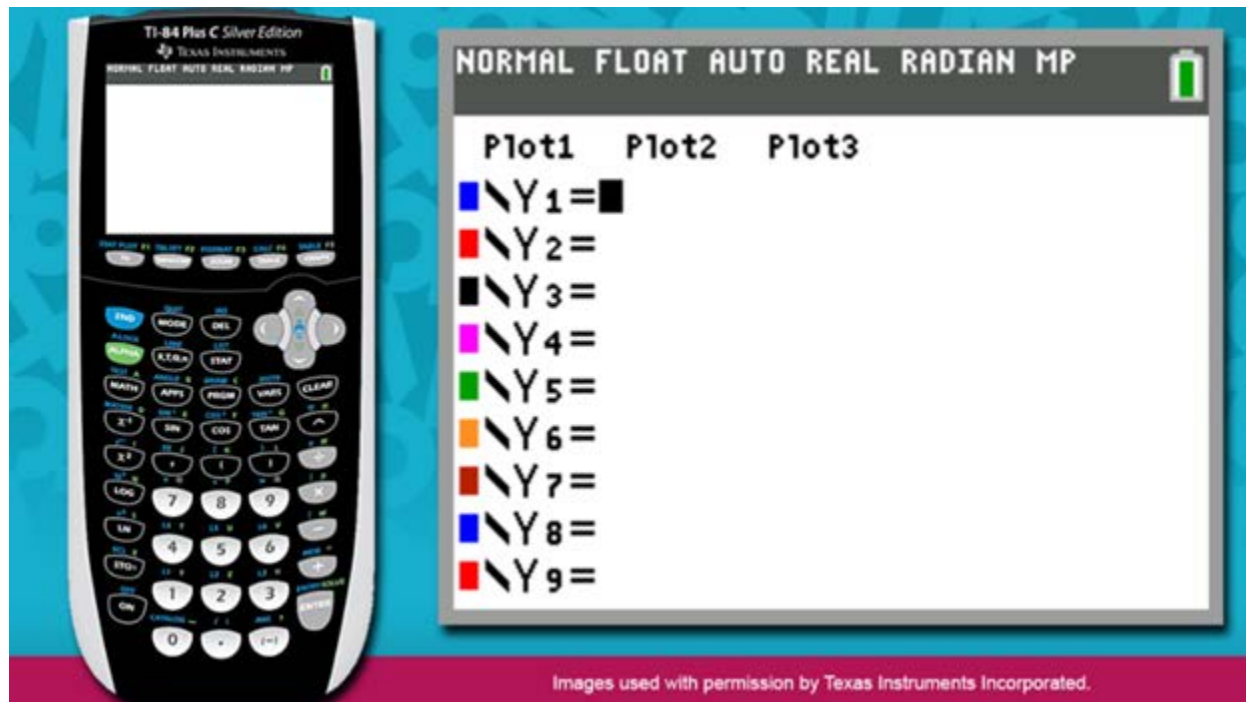
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To verify the factors, begin by defining the function $y = x^2 - 6x + 5$ to represent the given trinomial and $y = (x - 2)(x - 3)$ to represent the given factors.

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Example 1 (continued)

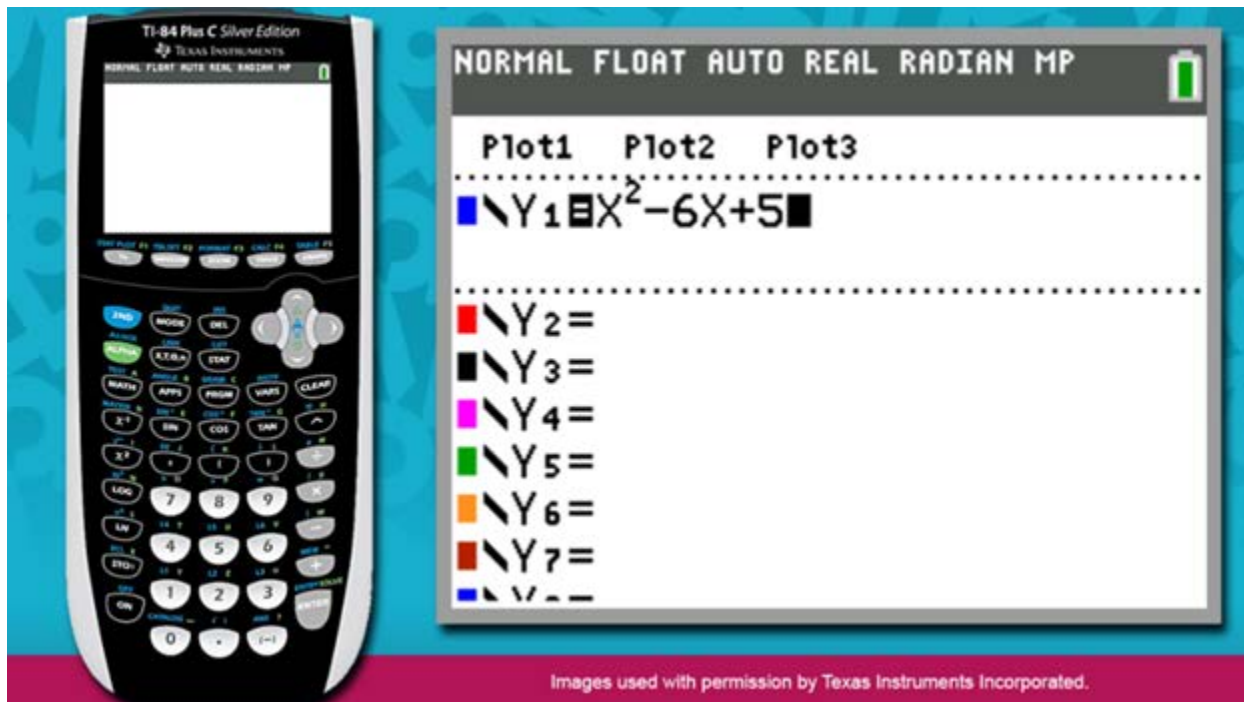


Enter these functions into the calculator. Press the Y= key. Enter the polynomial expression to the right of Y₁.

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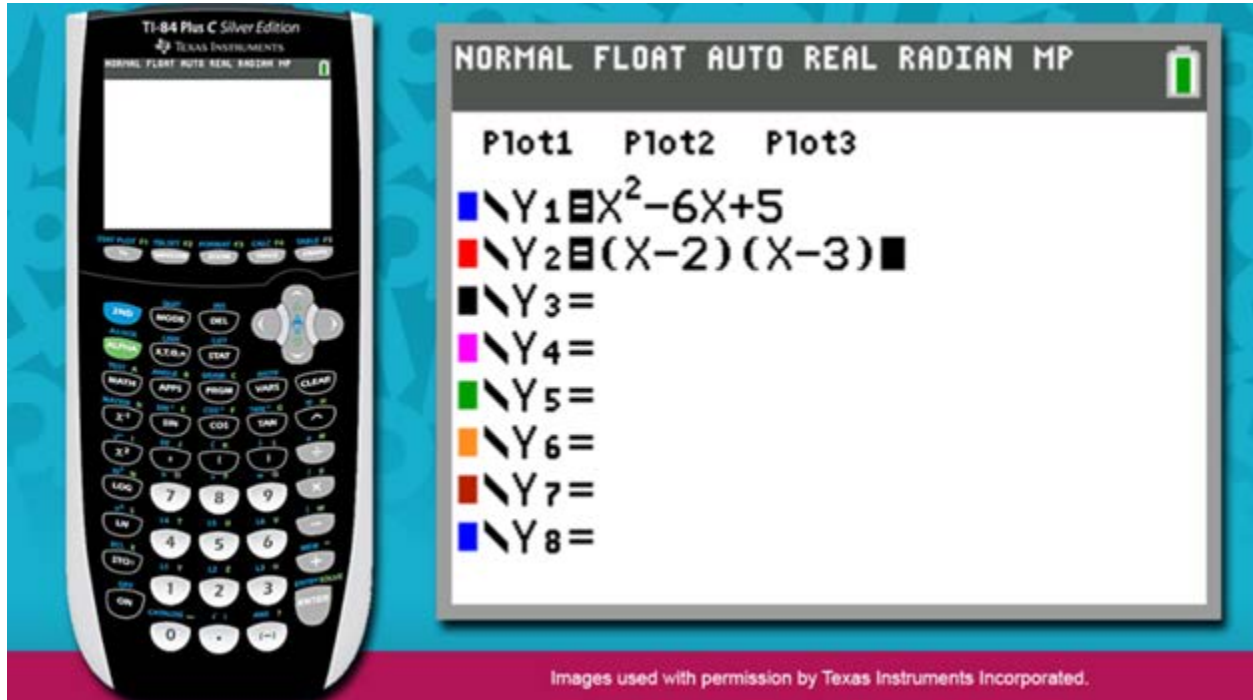
Example 1 (continued)



Press the key to the right of the green alpha key to type the variable x . Then, press the x^2 key, located a few keys below the green alpha key. Then, press the subtraction key, then the 6 key, and then x key. Press the addition key, and then the 5 key.

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Example 1 (continued)

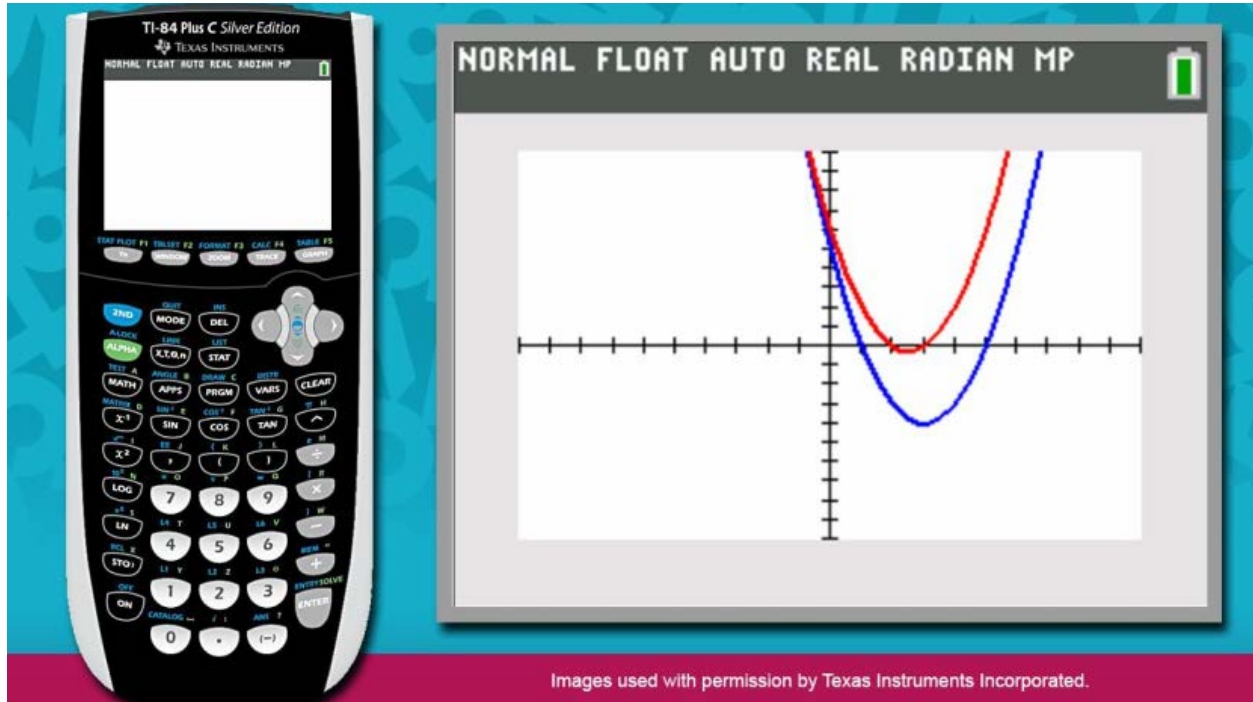


Next, press the down arrow key to move the cursor to Y2. Enter the factors to be verified to the right of Y2. The parentheses keys are located above the 8 key and the 9 key.

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Example 1 (continued)




Press GRAPH.

Notice that two U-shaped curves, known as parabolas, now appear on the screen. The blue parabola represents the function defined by the given polynomial: $y = x^2 - 6x + 5$; the red parabola represents the function defined by the factors: $y = (x - 2)(x - 3)$.

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Example 1 (continued)



EXAMPLE 1

Use the graphing calculator to verify the factors of the polynomial: $x^2 - 6x + 5$.
Are the factors of the trinomial $(x - 2)(x - 3)$?

Since the two parabolas do not intersect at every point, the binomials $(x - 2)(x - 3)$ are not factors.


If the two parabolas did intersect at every point, then the binomials would be factors.

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These parabolas do not intersect at every point. So, you can conclude that the binomials are not factors of the given polynomial. If the two parabolas intersected at every point, you could conclude that the binomials were factors of the given polynomial.

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Self-Check 1

 **Self-Check**

Use the graphing calculator to verify the factors of the polynomial below.

Are $(x + 5)$ and $(x - 1)$ factors of $x^2 + 4x - 5$?

- Yes
- No

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Self-Check: Answer Part One

Correct

That's correct! First, define the function $y = x^2 + 4x - 5$ to represent the given trinomial and $y = (x + 5)(x - 1)$ to represent the given factors.

Then, press the Y= key.

Enter the polynomial expression to the right of Y₁.

Enter the factors to be verified to the right of Y₂.

Calculator Screen:


Plot1	Plot2	Plot3
Y ₁	X ² +4X-5	
Y ₂	(X+5)(X-1)	
Y ₃	=	
Y ₄	=	
Y ₅	=	
Y ₆	=	
Y ₇	=	
Y ₈	=	

Part One Part Two Continue

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Self-Check: Answer Part Two

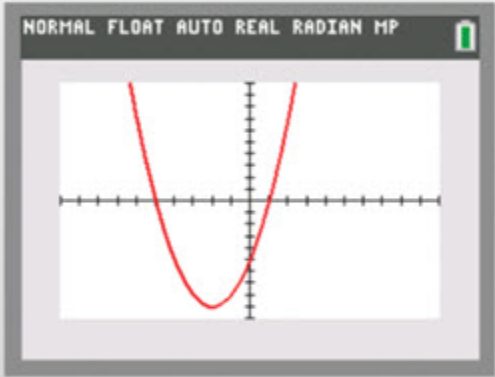
 **Self Check**

Correct

Press **GRAPH**.

You should only see one red parabola on the calculator screen. This is because the red parabola overlaps the blue parabola at every point. The graphs are identical.

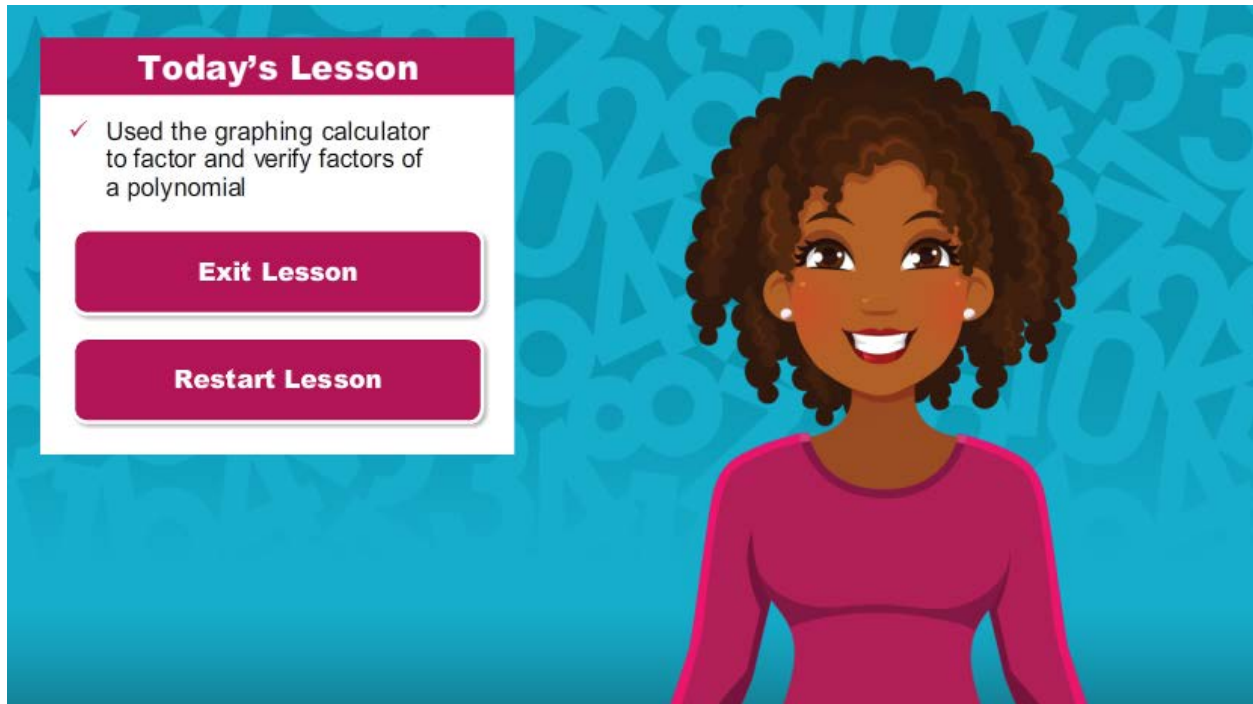
Therefore, the binomials $(x + 5)$ and $(x - 1)$ are factors of the given polynomial.



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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 graphing calculator to factor and verify factors of a polynomial". Below this are two pink buttons labeled "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 blue pattern of mathematical symbols.

You have reached the conclusion of this lesson in Algebra I, where you learned how to use the graphing calculator to verify factors of a polynomial.