

# Module 3: Adding and Subtracting Polynomials

## Topic 2 Content: Finding Products of Polynomials

### Introduction



**Today's Lesson**

- You will learn how to determine the products of polynomials.
- You will use your knowledge of the distributive property and combining like terms.

Hello and welcome! In this lesson, you will learn how to determine the products of polynomials. Your knowledge of the distributive property and combining like terms are the keys to success in this lesson. Let's get started!

## Module 3: Adding and Subtracting Polynomials

### Topic 2 Content: Finding Products of Polynomials

#### Finding Products of Polynomials



The graphic features a dark background with faint chalkboard-style math symbols. At the top, a blue rounded rectangle contains the title "FINDING PRODUCTS OF POLYNOMIALS" in white. Below this, a yellow text prompt reads "Click the Examples Below to Learn More". Three pink rounded rectangles are arranged in a 2x2 grid: "Example One" (top-left), "Self-Check" (top-right), and "Example Two" (bottom-left). In the bottom right corner, there is a photograph of white algebra blocks on a chalkboard.

Click the examples below to learn more.

- Example One
- Example Two
- Self-Check

**Module 3: Adding and Subtracting Polynomials**  
**Topic 2 Content: Finding Products of Polynomials**

**Example 1**

**EXAMPLE 1**

Simplify the expression  $-4x(x + 3)$

$$-4x(x + 3)$$
$$-4x^2 - 12x$$

Menu

Simplify the expression below.

$$-4x(x + 3)$$

In this example, you must multiply a monomial by a binomial. To find this product, you must apply the distributive property. Multiply  $-4x$  by each term in the binomial and then simplify the resulting expression.

$$\begin{aligned} -4x(x) &= -4x^2 \\ -4x(3) &= -12x \end{aligned}$$

There are no like terms to combine, so your work is complete. The final answer is

$$-4x^2 - 12x.$$

**Module 3: Adding and Subtracting Polynomials**  
**Topic 2 Content: Finding Products of Polynomials**

**Example 2**

**EXAMPLE 2**

Simplify the expression  $(x - 2)(3x - 5)$ .

$(x - 2)(3x - 5)$

Which of the following values represents the product?

$x \cdot 3x = ?$     **$3x^2$**     **$3x$**     **$4x$**

Simplify the expression below.

$$(x - 2)(3x - 5)$$

In this example, you must multiply a binomial by a binomial. To determine this product, you must apply the distributive property. First, multiply  $x$  by each term in the second binomial.

Which of the following values represents the product?

$$x \cdot 3x = ?$$

- A)  $3x^2$
- B)  $3x$
- C)  $4x$

**Module 3: Adding and Subtracting Polynomials**  
**Topic 2 Content: Finding Products of Polynomials**

Example 2 (continued)

**EXAMPLE 2**

Simplify the expression  $(x - 2)(3x - 5)$ .

$(x - 2)(3x - 5)$

$3x^2$

Notice that  $x$  times  $3x$  is equal to  $3x^2$ .

$x \cdot 3x = 3x^2$   $3x^2$

**Next**

Notice that  $x \cdot 3x = 3x^2$ .

**Module 3: Adding and Subtracting Polynomials**  
**Topic 2 Content: Finding Products of Polynomials**

Example 2 (continued)

**EXAMPLE 2**

Simplify the expression  $(x - 2)(3x - 5)$ .

$(x - 2)(3x - 5)$

$3x^2$

Now, multiply  $x$  by  $-5$ .  
Which of the following values represents the product?

$x \cdot -5 = ?$

$x^{-5}$      $-5x$      $-4x$

Now, multiply  $x$  by  $-5$ . Which of the following values represents the product?

$x \cdot -5 = ?$

- A)  $x^{-5}$
- B)  $-5x$
- C)  $-4x$

**Module 3: Adding and Subtracting Polynomials**  
**Topic 2 Content: Finding Products of Polynomials**

Example 2 (continued)

**EXAMPLE 2**

Simplify the expression  $(x - 2)(3x - 5)$ .

$(x - 2)(3x - 5)$

$3x^2 - 5x$

Notice that  $x$  times  $-5$  is equal to  $-5x$ .

$x \cdot -5 = -5x$       **-5x**

**Next**

Notice that  $x \cdot -5 = -5x$ .

**Module 3: Adding and Subtracting Polynomials**  
**Topic 2 Content: Finding Products of Polynomials**

Example 2 (continued)

**EXAMPLE 2**

Simplify the expression  $(x - 2)(3x - 5)$ .

$(x - 2)(3x - 5)$

$3x^2 - 5x$

Which of the following values represents the product?

$-2 \cdot 3x = ?$

$6x^{-2}$      $-5x$      $-6x$

Now multiply the second term in the first binomial,  $-2$ , by each term in the second binomial.

Which of the following values represents the product?

$-2 \cdot 3x = ?$

- A)  $6x^{-2}$
- B)  $-5x$
- C)  $-6x$



**Module 3: Adding and Subtracting Polynomials**  
**Topic 2 Content: Finding Products of Polynomials**

Example 2 (continued)

**EXAMPLE 2**

Simplify the expression  $(x - 2)(3x - 5)$ .

$(x - 2)(3x - 5)$

$3x^2 - 5x - 6x$

Notice that  $-2$  times  $3x$  is equal to  $-6x$ .

$-2 \cdot 3x = -6x$

**-6x**

**Next**

Notice that  $-2 \cdot 3x = -6x$ .

**Module 3: Adding and Subtracting Polynomials**  
**Topic 2 Content: Finding Products of Polynomials**

Example 2 (continued)

**EXAMPLE 2**

Simplify the expression  $(x - 2)(3x - 5)$ .

$(x - 2)(3x - 5)$

$3x^2 - 5x - 6x$

Now, multiply  $-2$  by  $-5$ .  
Enter the correct answer below and click *SUBMIT*.

$-2 \cdot -5 =$

**Submit**

Now multiply  $-2$  by  $-5$ .

$$-2 \cdot -5 = ?$$

Enter the correct answer below and click *SUBMIT*.

**Module 3: Adding and Subtracting Polynomials**  
**Topic 2 Content: Finding Products of Polynomials**

Example 2 (continued)

**EXAMPLE 2**

Simplify the expression  $(x - 2)(3x - 5)$ .

$$(x - 2)(3x - 5)$$
$$3x^2 - 5x - 6x + 10$$

Notice that  $-2$  times  $-5$  is equal to  $10$ .

$$-2 \cdot -5 = 10$$

Next

Notice that  $-2 \cdot -5 = 10$ .

**Module 3: Adding and Subtracting Polynomials**  
**Topic 2 Content: Finding Products of Polynomials**

Example 2 (continued)

**EXAMPLE 2**

Simplify the expression  $(x - 2)(3x - 5)$ .

$$(x - 2)(3x - 5)$$
$$3x^2 - 5x - 6x + 10$$
$$3x^2 - 11x + 10$$

Menu


Now you have a polynomial expression that represents the product. Simplify the expression by combining like terms.

$$-5x - 6x = -11x$$

So, the product of the binomials is  $3x^2 - 11x + 10$ .

Module 3: Adding and Subtracting Polynomials  
Topic 2 Content: Finding Products of Polynomials

Self-Check 1

 **Self-Check**

Simplify the expression  $(-x + 4)(x - 1)$ . First, apply the distributive property.

$(-x + 4)(x - 1)$     $(-x + 4)(x - 1)$     $(-x + 4)(x - 1)$     $(-x + 4)(x - 1)$

**Drag the correct terms below to the appropriate spot above.**

$-x^2$     $x$     $2x$     $4x$     $4$     $-4$

**SUBMIT**

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

**Module 3: Adding and Subtracting Polynomials**  
**Topic 2 Content: Finding Products of Polynomials**

**Self-Check 1: Answer**

**Correct**

That's correct! You can see how the distributive property is applied below.

$(-x + 4)(x - 1)$	$(-x + 4)(x - 1)$	$(-x + 4)(x - 1)$	$(-x + 4)(x - 1)$
$-x^2$	$x$	$4x$	$-4$
$-x \cdot x = -x^2$	$-x \cdot -1 = x$	$4 \cdot x = 4x$	$4 \cdot -1 = -4$

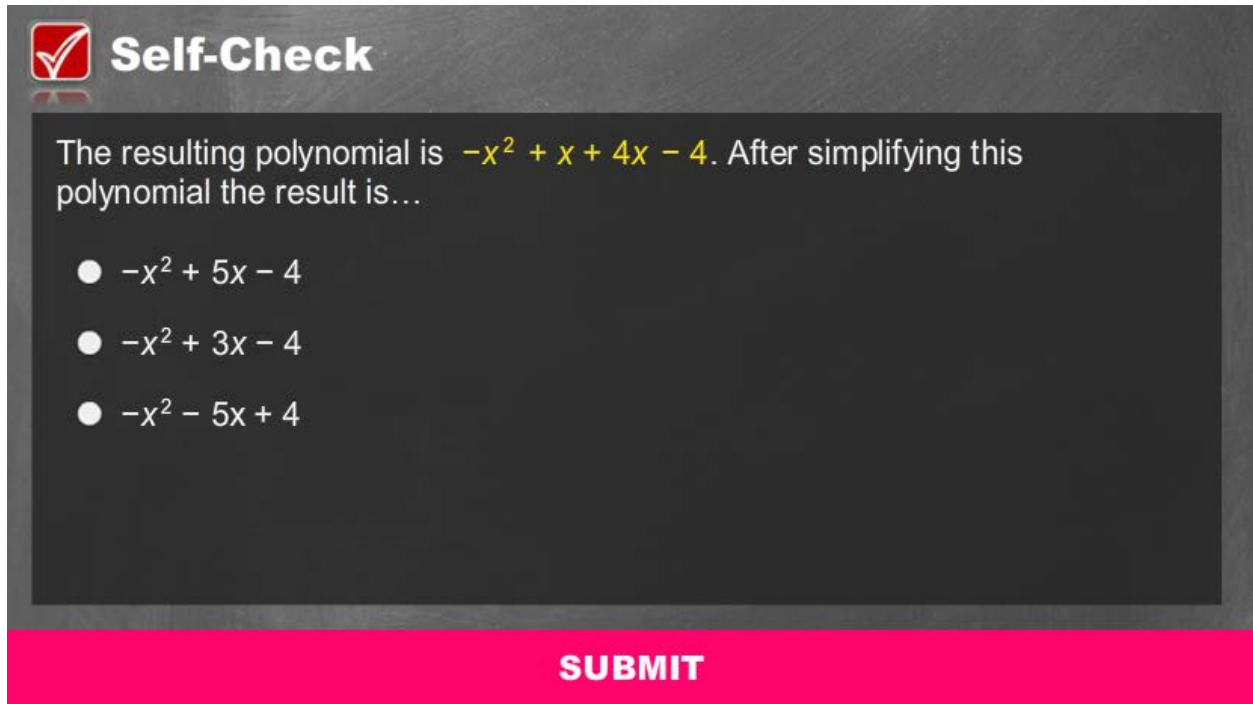
Continue

**SUBMIT**

For your reference, the image above shows the correct solution to the self-check problem.

**Module 3: Adding and Subtracting Polynomials**  
**Topic 2 Content: Finding Products of Polynomials**

**Self-Check 2**

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 "The resulting polynomial is  $-x^2 + x + 4x - 4$ . After simplifying this polynomial the result is...". Underneath are three radio button options:  $-x^2 + 5x - 4$ ,  $-x^2 + 3x - 4$ , and  $-x^2 - 5x + 4$ . At the bottom of the interface is a bright pink bar with the word "SUBMIT" in white capital letters.

**Self-Check**

The resulting polynomial is  $-x^2 + x + 4x - 4$ . After simplifying this polynomial the result is...

- $-x^2 + 5x - 4$
- $-x^2 + 3x - 4$
- $-x^2 - 5x + 4$

**SUBMIT**

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

**Module 3: Adding and Subtracting Polynomials**  
**Topic 2 Content: Finding Products of Polynomials**

**Self-Check 2: Answer**

**Correct**

That's correct! After combining the like terms, the result is  $-x^2 + 5x - 4$ .

$$-x^2 + x + 4x - 4$$
$$-x^2 + 5x - 4$$

Continue

**SUBMIT**

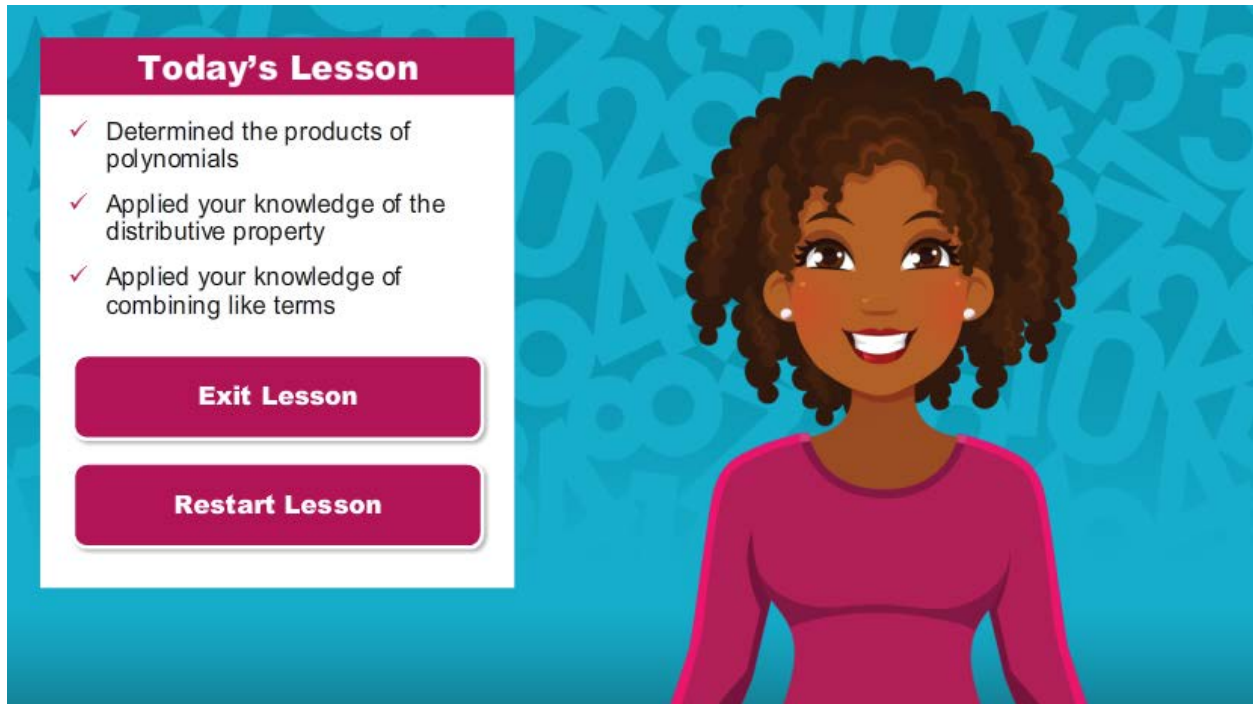
For your reference, the image above shows the correct solution to the self-check problem.



## Module 3: Adding and Subtracting Polynomials

### Topic 2 Content: Finding Products of Polynomials

#### 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 checklist of three items, each with a checkmark: "Determined the products of polynomials", "Applied your knowledge of the distributive property", and "Applied your knowledge of combining like terms". Below the list 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 blue pattern of mathematical symbols like pi, infinity, and numbers.

Congratulations! You have reached the conclusion of this lesson in Algebra I, where you learned how to determine the products of polynomials. Your knowledge of the distributive property and combining like terms were the keys to successfully progressing through this lesson.