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

Introduction

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!

Finding Products of Polynomials

Click the examples below to learn more.

- Example One
- Example Two
- Self-Check

Example 1

EXAMPLE 1

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

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

$$\boxed{-4x^2 - 12x}$$

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.

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

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

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

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Example 2

EXAMPLE 2

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

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

Which of the following values represents the product?

$x \cdot 3x = ?$ `3x²`   `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) $4x$

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

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) $-4x$

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

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) $-6x$

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 $-6x$.

$$-2 \cdot 3x = -6x \qquad \boxed{-6x}$$

Next

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

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*.

$$-2 \cdot -5 = \boxed{}$$

Submit

Now multiply -2 by -5.

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

Enter the correct answer below and click *SUBMIT*.

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 $-2 \cdot -5 = 10$.

Example 2 (continued)

EXAMPLE 2

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

$$(x - 2)(3x - 5)$$
$$3x^2 - 5x - 6x + 10$$
$$\boxed{3x^2 - 11x + 10}$$

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 $3x^2 - 11x + 10$.

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.

Self-Check 1: Answer

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

Self-Check 2

☑ **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.

Self-Check 2: Answer

Correct

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

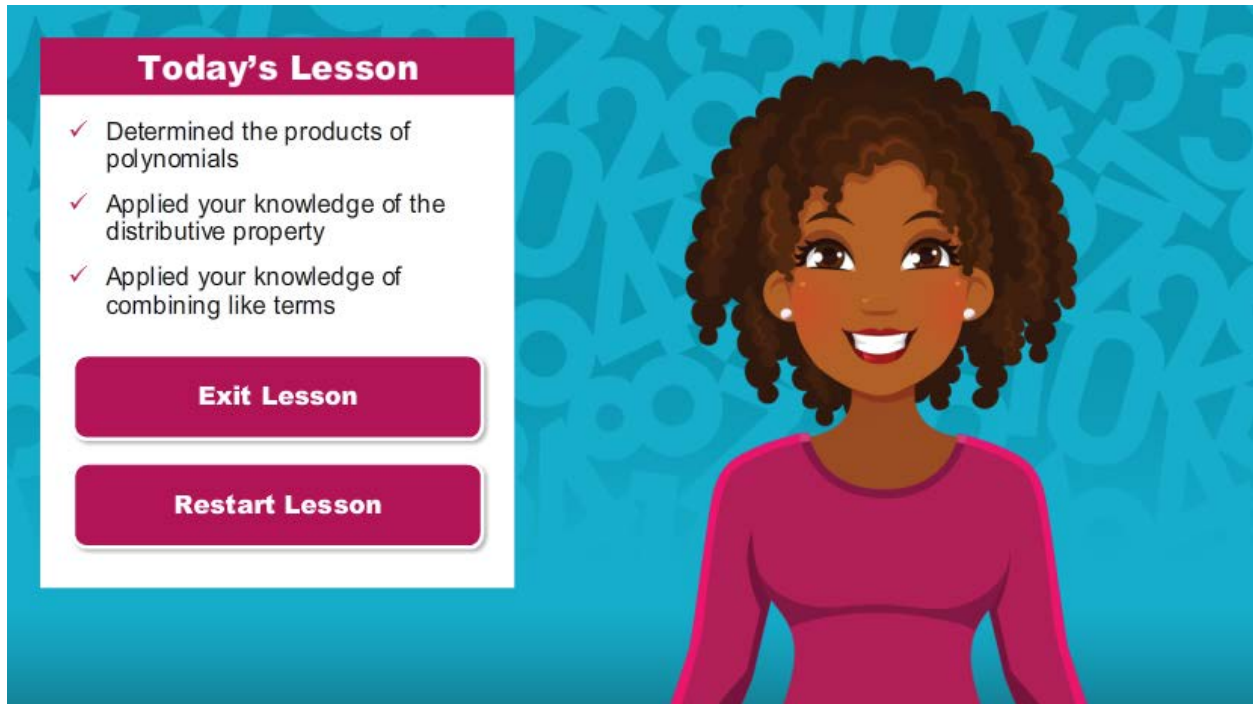$$-x^2 + x + 4x - 4$$

$$\boxed{-x^2 + 5x - 4}$$
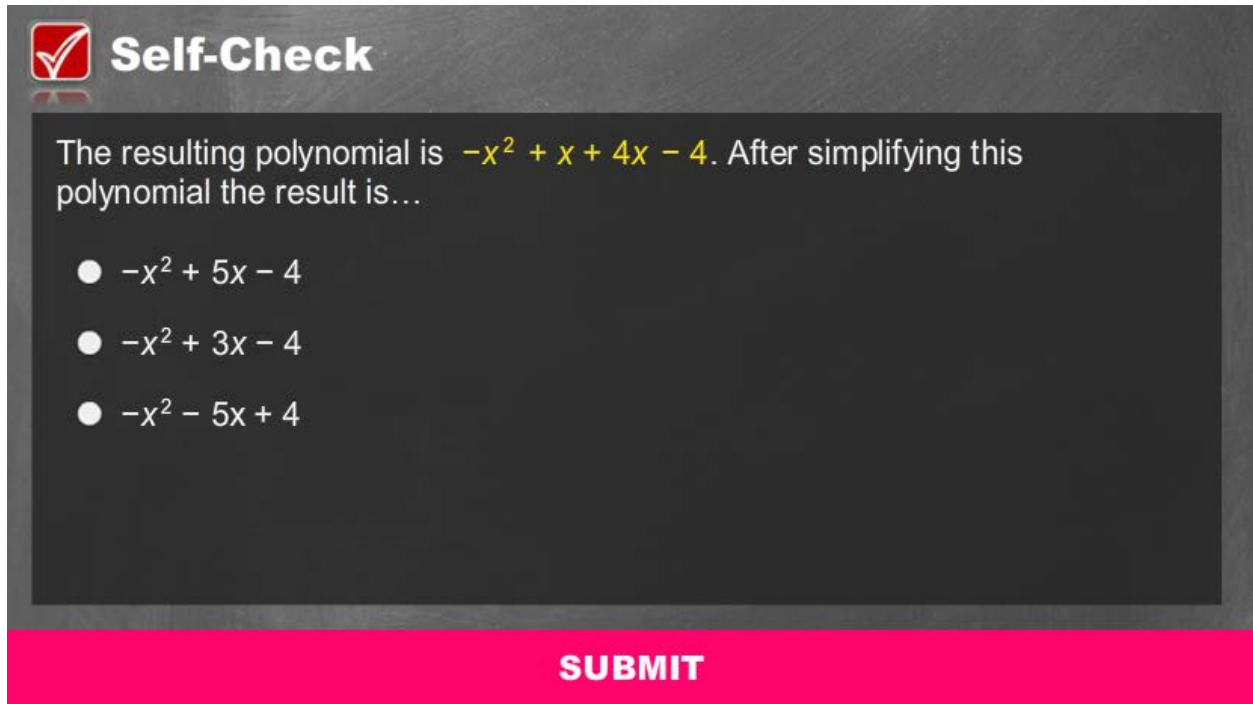
Continue

SUBMIT

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

Conclusion

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.