

# Module 3: Adding and Subtracting Polynomials

## Topic 1 Content: Adding Polynomials – Algebra Tiles

### Introduction



**Today's Lesson**

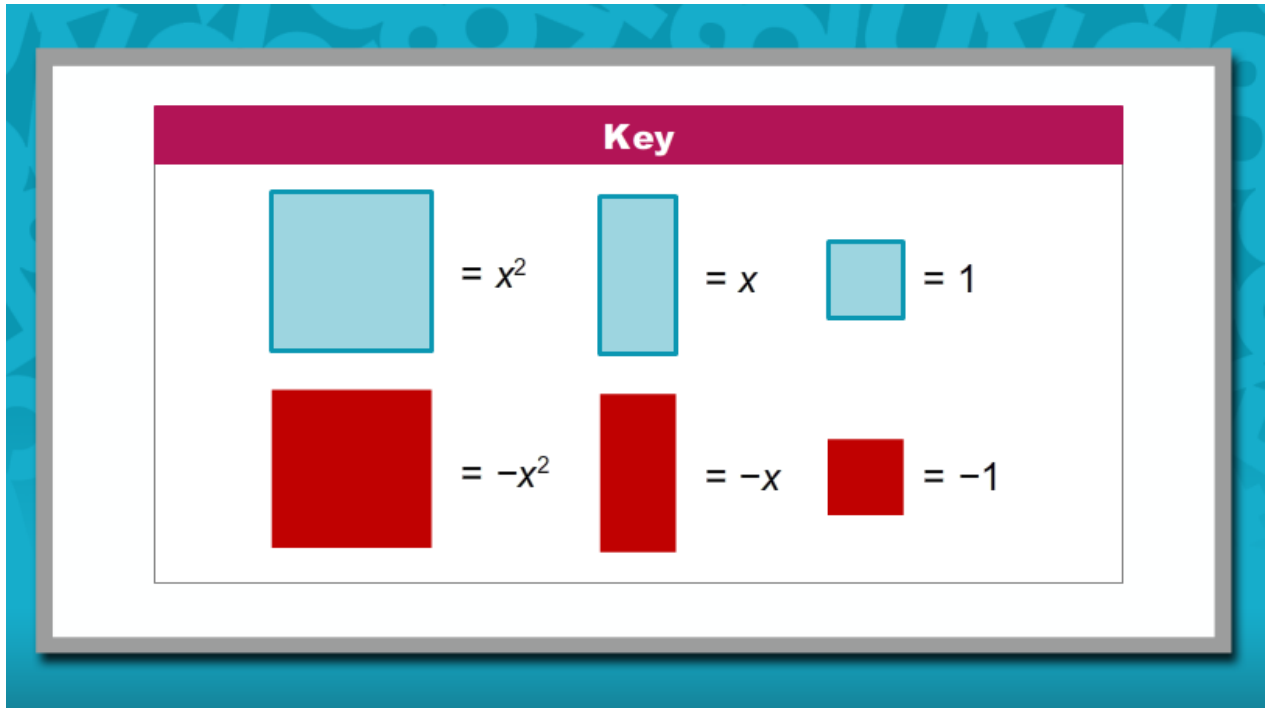
- You will learn how to use algebra tiles to model and simplify sums of polynomial expressions.
- You will use your knowledge of algebra tiles.

Hello and welcome! I'm so glad to have you here for this lesson in Algebra I, where you will learn how to use algebra tiles to model and simplify sums of polynomial expressions. Your knowledge of how to use algebra tiles to model integer operations will be a useful skill during this lesson.

## Module 3: Adding and Subtracting Polynomials

### Topic 1 Content: Adding Polynomials – Algebra Tiles

#### Anticipatory Set



Take a moment to review what each algebra tile represents.

**Module 3: Adding and Subtracting Polynomials**  
**Topic 1 Content: Adding Polynomials – Algebra Tiles**

**Adding Polynomials – Algebra Tiles**

**ADDING POLYNOMIALS – ALGEBRA TILES**

**Click the Examples Below to Learn More**

Example

Self-Check

Click the examples below to learn more.

- Example
- Self-Check

## Module 3: Adding and Subtracting Polynomials

### Topic 1 Content: Adding Polynomials – Algebra Tiles

#### Example

**Key**

$x^2$     $x$     $1$

$-x^2$     $-x$     $-1$

**EXAMPLE**

Use algebra tiles to model and simplify the expression

$$(3x^2 + 4x - 2) + (x^2 - 6x + 5)$$

Drop Area

Drag the appropriate tiles from the key and drop them on the right.

Use algebra tiles to model and simplify the expression below.

$$(3x^2 + 4x - 2) + (x^2 - 6x + 5)$$

To model this sum, begin by using algebra tiles to model the first polynomial:  $3x^2 + 4x - 2$ .

You will need:

- 3 blue  $x^2$  tiles to represent  $3x^2$
- 4 blue rectangles to represent  $4x$ , and
- 2 red 1-unit tiles to represent  $-2$ .

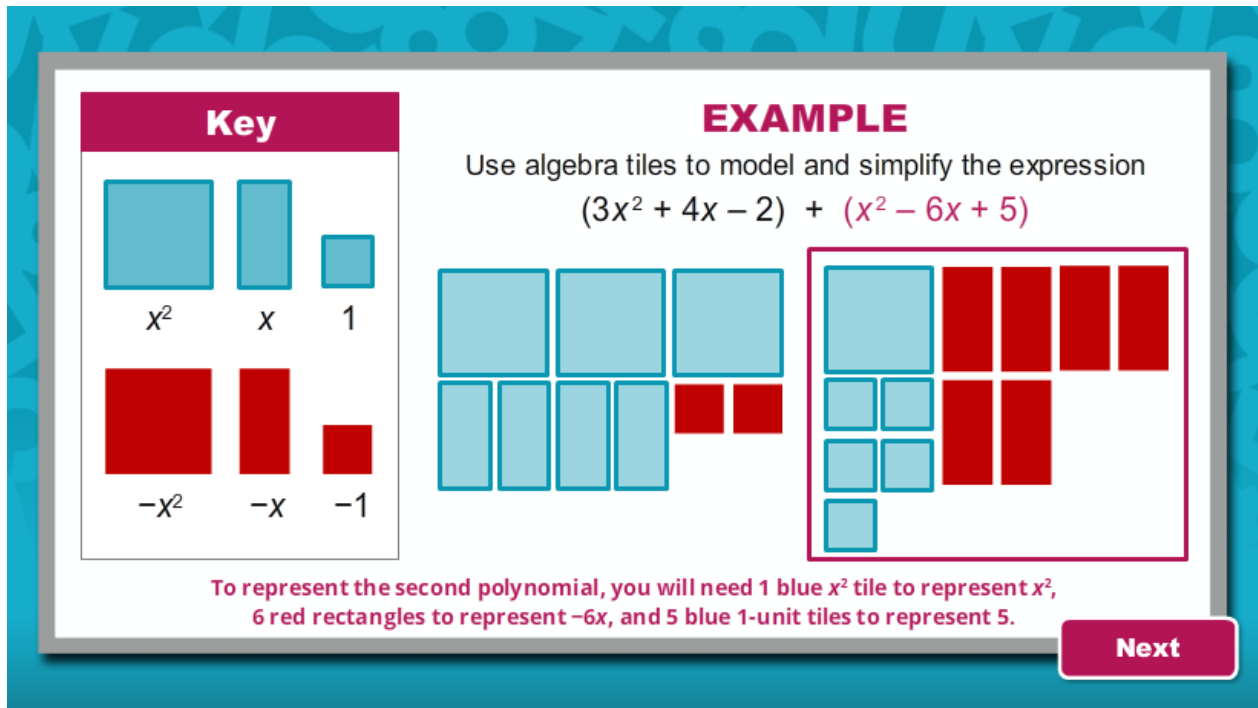
Now use algebra tiles to represent the second polynomial:  $x^2 - 6x + 5$ .

Drag the appropriate tiles from the key and drop them on the right.

## Module 3: Adding and Subtracting Polynomials

### Topic 1 Content: Adding Polynomials – Algebra Tiles

Example (continued)



The diagram illustrates the addition of two polynomials using algebra tiles. On the left, a 'Key' identifies the tiles: a large blue square for  $x^2$ , a medium blue rectangle for  $x$ , and a small blue square for  $1$ . A red square represents  $-x^2$ , a red rectangle represents  $-x$ , and a red square represents  $-1$ . The 'EXAMPLE' section shows the expression  $(3x^2 + 4x - 2) + (x^2 - 6x + 5)$ . The first polynomial is represented by 3 blue  $x^2$  tiles, 4 blue  $x$  tiles, and 2 red  $-1$  tiles. The second polynomial is represented by 1 blue  $x^2$  tile, 6 red  $-x$  tiles, and 5 blue  $1$  tiles. A text box explains that to represent the second polynomial, you need 1 blue  $x^2$  tile, 6 red rectangles, and 5 blue 1-unit tiles. A 'Next' button is located at the bottom right.

**Key**

$x^2$     $x$     $1$

$-x^2$     $-x$     $-1$

**EXAMPLE**

Use algebra tiles to model and simplify the expression

$$(3x^2 + 4x - 2) + (x^2 - 6x + 5)$$

To represent the second polynomial, you will need 1 blue  $x^2$  tile to represent  $x^2$ , 6 red rectangles to represent  $-6x$ , and 5 blue 1-unit tiles to represent 5.

**Next**

To represent the second polynomial  $x^2 - 6x + 5$ , you will need:

- 1 blue  $x^2$  tile to represent  $x^2$ ,
- 6 red rectangles to represent  $-6x$ , and
- 5 blue 1-unit tiles to represent 5.

## Module 3: Adding and Subtracting Polynomials

### Topic 1 Content: Adding Polynomials – Algebra Tiles

Example (continued)

**EXAMPLE**

Use algebra tiles to model and simplify the expression

$$(3x^2 + 4x - 2) + (x^2 - 6x + 5)$$

$(3x^2 + x^2)$     +     $(4x - 6x)$     +     $(-2 + 5)$

$4x^2 - 2x + 3$

**Menu**

Now that you have modeled each polynomial, it is time to group the like tiles together so that you can determine the sum. Group all of the  $x^2$  tiles together, all of the rectangles together, and all of the 1-unit tiles together.

Now simplify.


- A.  $3x^2 + x^2 = 4x^2$   
 $3x^2 + x^2$  is  $4x^2$ .
- B.  $4x - 6x = -2x$   
After eliminating the zero pairs, you find that  $4x$  combined with  $-6x$  is  $-2x$ .
- C.  $-2 + 5 = 3$   
After eliminating more zero pairs, you also find that  $-2 + 5$  is 3.

So the sum of the polynomials is  $4x^2 - 2x + 3$ .

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### Topic 1 Content: Adding Polynomials – Algebra Tiles

#### Self-Check 1



### Self-Check

Use algebra tiles to model and simplify the following expression:







$$(5x + 1) + (2x^2 - 2x - 4)$$

$(5x + 1)$       +       $(2x^2 - 2x - 4)$

Drop Area      Drop Area

**Drag the appropriate tiles from the key and drop them on the right.**

#### Key

		
$x^2$	$x$	1
		
$-x^2$	$-x$	$-1$

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

## Module 3: Adding and Subtracting Polynomials

### Topic 1 Content: Adding Polynomials – Algebra Tiles

#### Self-Check 1: Answer

**Correct**

That's correct! You need to group the like tiles together as follows.

$(5x + 1) + (2x^2 - 2x - 4)$

The diagram shows two groups of algebra tiles. The first group, representing  $(5x + 1)$ , consists of five vertical blue rectangles and one small blue square. The second group, representing  $(2x^2 - 2x - 4)$ , consists of two large blue squares, two vertical red rectangles, and four small red squares. A "Continue" button is located at the bottom of the interface.


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



## Module 3: Adding and Subtracting Polynomials

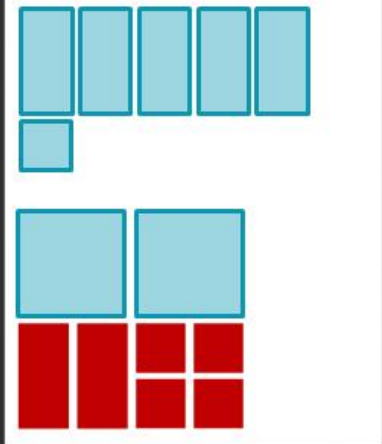
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#### Self-Check 2

 **Self-Check**

Use algebra tiles to model and simplify the following expression:

$$(5x + 1) + (2x^2 - 2x - 4)$$
$$2x^2 + (5x - 2x) + (1 - 4)$$



Drop Area      Drop Area      Drop Area

**Group the like tiles together by dragging them to the areas on the right.**

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

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**Topic 1 Content: Adding Polynomials – Algebra Tiles**


**Self-Check 2: Answer**

The image shows a digital interface for a self-check. At the top left, there is a red checkmark icon and the text "Self-Check". Below this, a grey box contains the word "Correct" and the message "That's correct! You need to group the like tiles together as follows." The main area displays three algebra tile arrangements corresponding to the terms  $2x^2$ ,  $(5x - 2x)$ , and  $(1 - 4)$ . The first arrangement consists of two large light blue squares. The second arrangement consists of five vertical light blue rectangles and two vertical red rectangles. The third arrangement consists of one small light blue square and four horizontal red rectangles. A "Continue" button is located at the bottom center of the grey box.

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

Module 3: Adding and Subtracting Polynomials  
Topic 1 Content: Adding Polynomials – Algebra Tiles

Self-Check 3

 **Self-Check**

Finally, determine the sum. Eliminate zero pairs, if necessary. Which of the following represents the sum of the polynomials?

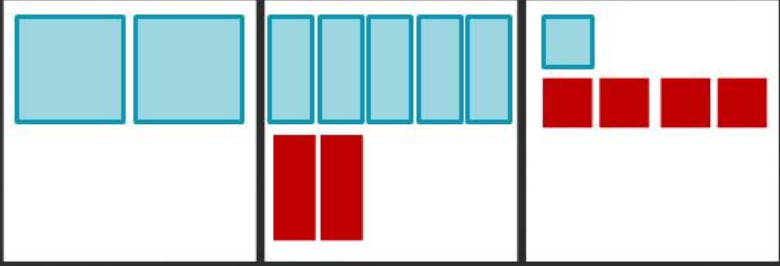
Use algebra tiles to model and simplify the following expression:

$$(5x + 1) + (2x^2 - 2x - 4)$$
$$2x^2 + (5x - 2x) + (1 - 4)$$

$2x^2 + 2x - 1$

$2x^2 + 3x - 3$

$2x^2 + 7x - 4$



**SUBMIT**

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

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**Topic 1 Content: Adding Polynomials – Algebra Tiles**

**Self-Check 3: Answer**

**Self-Check**

**Correct**

That's correct! After eliminating zero pairs, the remaining algebra tiles represent the following polynomial.

$2x^2 + 3x - 3$

$2x^2 + (5x - 2x) + (1 - 4)$

The diagram shows algebra tiles arranged in three columns. The first column has two large blue squares representing  $2x^2$ . The second column has five vertical blue rectangles representing  $5x$  and two vertical red rectangles representing  $-2x$ , which are crossed out with diagonal lines. The third column has one small blue square representing  $1$  and four small red squares representing  $-4$ , with one blue square and one red square crossed out to form a zero pair. Below the tiles are labels:  $2x^2$ ,  $3x$ , and  $-3$ .

Continue

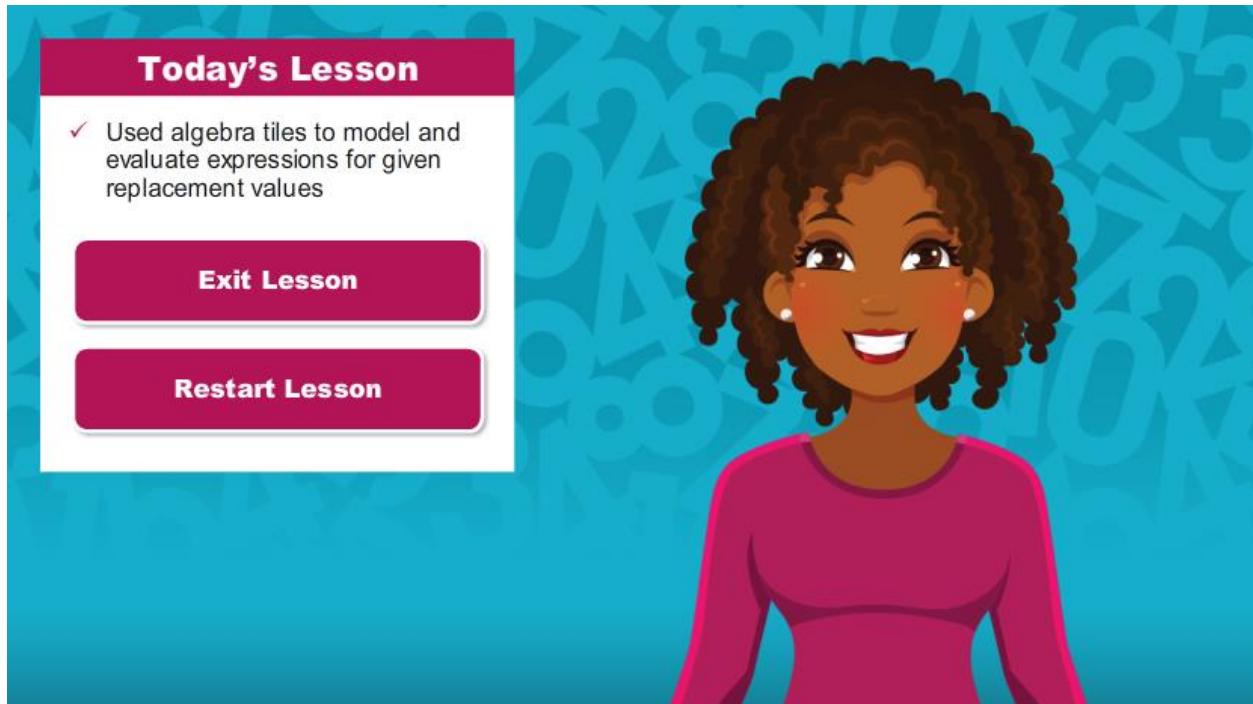
**SUBMIT**

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

## Module 3: Adding and Subtracting Polynomials

### Topic 1 Content: Adding Polynomials – Algebra Tiles

#### Conclusion



**Today's Lesson**

- ✓ Used algebra tiles to model and evaluate expressions for given replacement values

**Exit Lesson**

**Restart Lesson**

Congratulations! You have reached the conclusion of this lesson in Algebra I. In this lesson, you were able to apply your knowledge of algebra tiles and integer operations to model and simplify sums of polynomial expressions.