

Module 1: Expressions

Topic 3: Algebra Tiles

Introduction



Today's Lesson

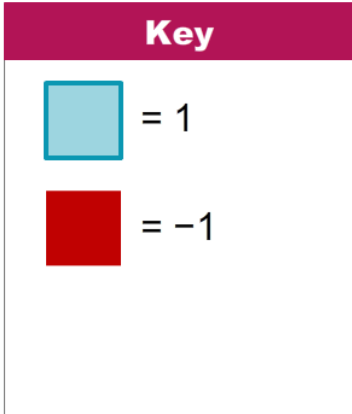
- You will learn how to use algebra tiles to model and evaluate algebraic expressions for given replacement values.

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 evaluate algebraic expressions for given replacement values. Your knowledge of how to use algebra tiles to model integer operations will be a useful skill during this lesson.

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Anticipatory Set



The image shows a key for algebra tiles. It is contained within a white rectangular box with a grey border, set against a blue background with a geometric pattern. The key has a purple header with the word "Key" in white. Below the header, there are two entries: a light blue square followed by "= 1", and a red square followed by "= -1".

You are most likely familiar with the use of algebra tiles to model integer operations. For example, let a blue square tile represent positive one, $+1$, and a red square tile represent negative one, -1 .

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Anticipatory Set (continued)

The diagram illustrates the numeric expression $-2 + 1$ using algebra tiles. On the left, a key defines the tiles: a blue square represents 1 and a red square represents -1 . On the right, the expression $-2 + 1$ is modeled with two red square tiles and one blue square tile.


The numeric expression “ $-2 + 1$ ” can be modeled by two red square tiles together with one blue square tile.


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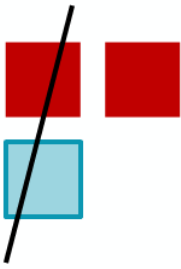
Anticipatory Set (continued)

Key

 = 1

 = -1

$-2 + 1 = -1$






You can then use your knowledge of zero pairs to simplify the numeric expression and determine that it has a value of -1 .

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Anticipatory Set (continued)

Key

-  = 1
-  = -1
-  = x

$-2 + 1 = -1$

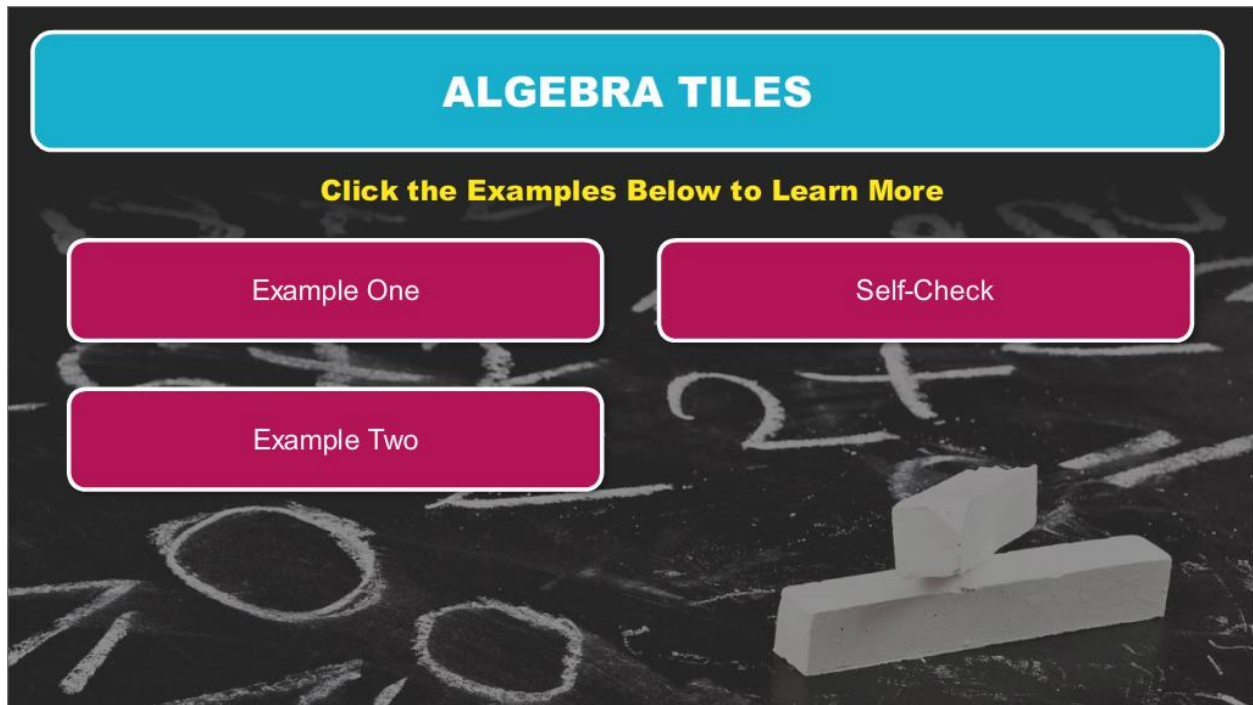
You will use algebra tiles to model algebraic expressions and evaluate them for given replacement values.

In the following examples, you will use algebra tiles to model algebraic expressions and evaluate them for given replacement values. A blue rectangular tile will be used to represent x .

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Algebra Tiles

An interactive interface for algebra tiles. At the top, a blue rounded rectangle contains the text "ALGEBRA TILES" in white. Below this, a yellow text prompt reads "Click the Examples Below to Learn More". Three pink rounded rectangles are arranged in a grid: "Example One" (top left), "Self-Check" (top right), and "Example Two" (bottom left). The background is a chalkboard with mathematical symbols and a photograph of white algebra tiles.

Click the examples below to learn more.


- Example 1
- Example 2
- Self-Check


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Example 1

Key


 = x

 = 1

 = -1

Use algebra tiles to model the substitution and evaluation of the following expression, for the given replacement value.

$-3 + x$, when $x = 5$



Use algebra tiles to model the substitution and evaluation of the following expression, for the given replacement value.

$$-3 + x, \text{ when } x = 5$$




Begin by using algebra tiles to model the algebraic expression “ $-3 + x$.” To represent -3 , you will need three red squares. To represent x , you will need one rectangle.

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Example 1 (continued)

Key

-  = x
-  = 1
-  = -1

Use algebra tiles to model the substitution and evaluation of the following expression, for the given replacement value.

$-3 + x$, when $x = 5$


Now perform the substitution. The problem states that x is equal to 5. So replace the rectangle with five blue squares.


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Example 1 (continued)

Key

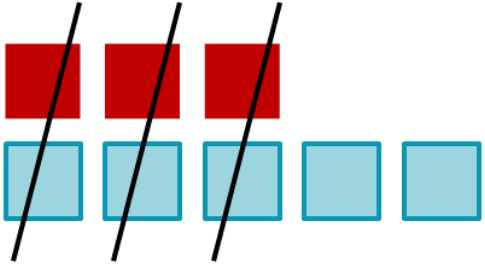
 = x

 = 1

 = -1

Use algebra tiles to model the substitution and evaluation of the following expression, for the given replacement value.

$-3 + x$, when $x = 5$



When $x = 5$, $-3 + x$ has a value of 2

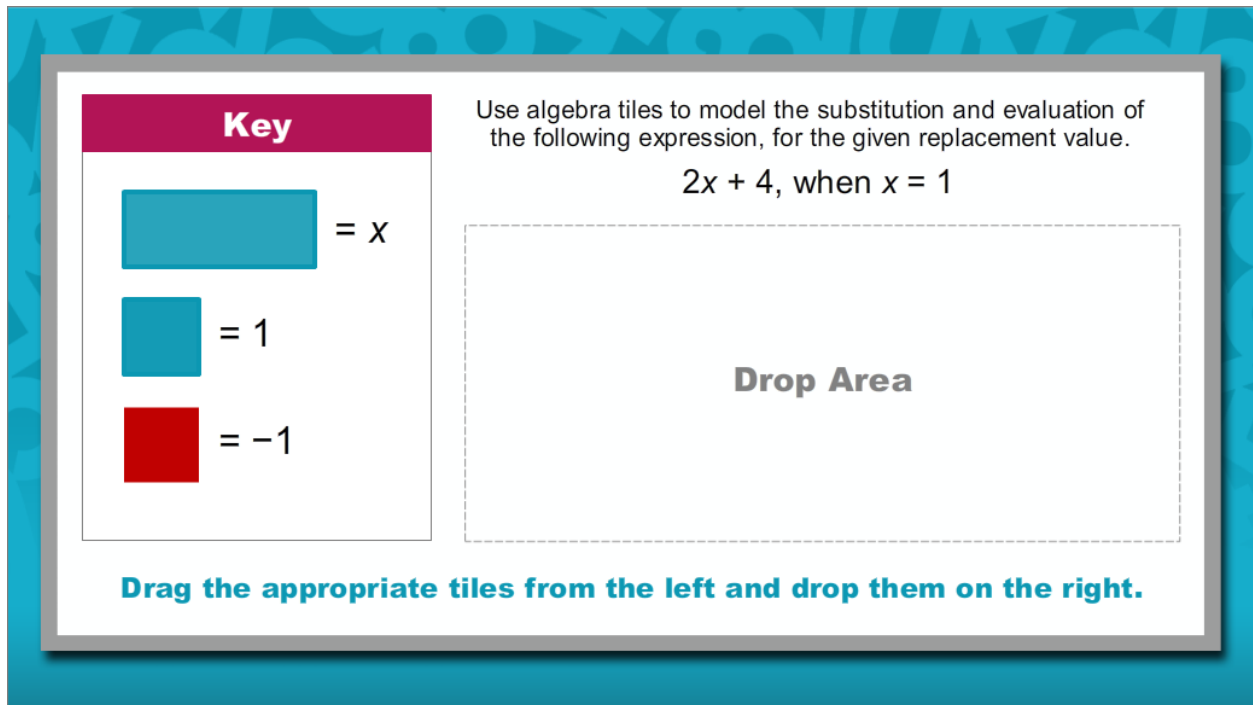
Menu

Because the remaining tiles represent both positive and negative values of one, you must use your knowledge of zero pairs to simplify. In this model, there are three zero pairs. After eliminating these zero pairs, two blue squares remain. Therefore, when $x = 5$, the expression “ $-3 + x$ ” has a value of 2.

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Example 2



The image shows an interactive interface for using algebra tiles. On the left, a 'Key' section defines the tiles: a large light blue rectangle represents x , a medium light blue square represents 1 , and a small red square represents -1 . On the right, a dashed box labeled 'Drop Area' is provided for placing the tiles. The expression $2x + 4$ and the replacement value $x = 1$ are displayed above the drop area. A blue instruction bar at the bottom of the interface reads: 'Drag the appropriate tiles from the left and drop them on the right.'

Use algebra tiles to model the substitution and evaluation of the following expression, for the given replacement value.

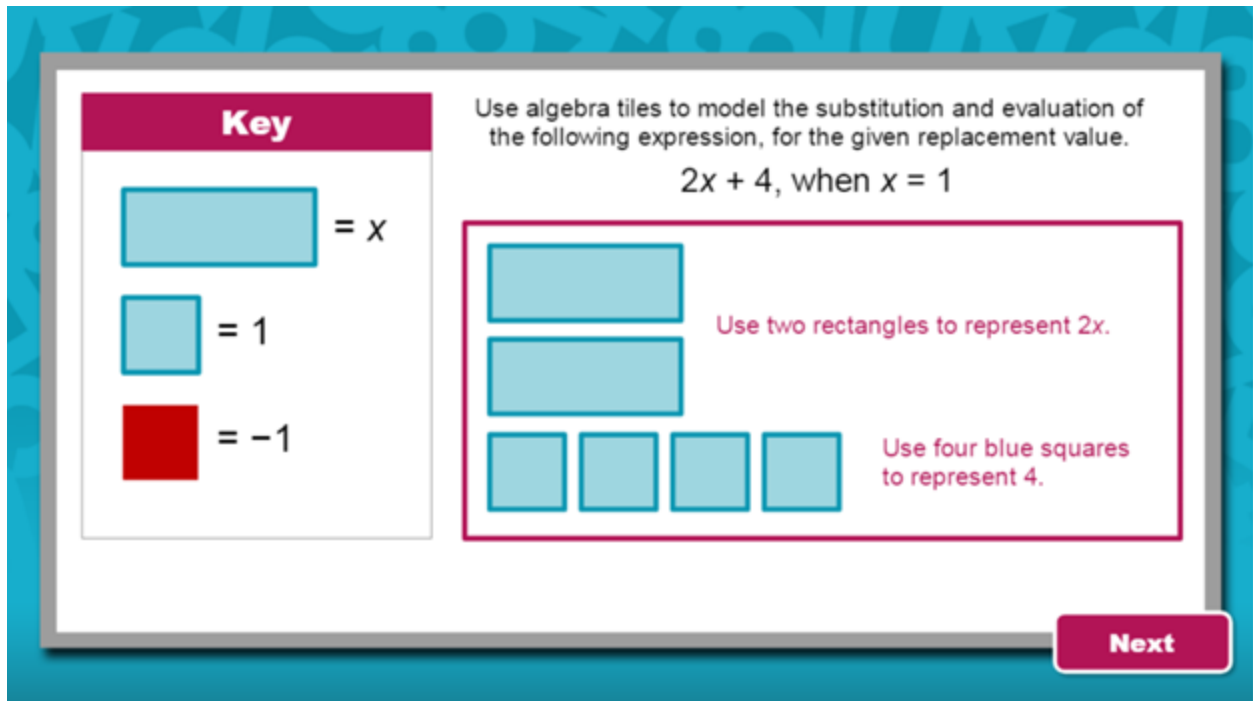
$$2x + 4, \text{ when } x = 1$$

First, drag and drop the correct tiles to represent the expression " $2x + 4$." Drag the appropriate tiles from the left and drop them on the right.

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Example 2 (continued)



The diagram shows a key and a main area for modeling the expression $2x + 4$ when $x = 1$. The key defines the tiles: a large blue rectangle is x , a small blue square is 1 , and a red square is -1 . The main area shows two large blue rectangles representing $2x$ and four small blue squares representing 4 . A 'Next' button is in the bottom right corner.

Key

$\text{Large blue rectangle} = x$

$\text{Small blue square} = 1$

$\text{Red square} = -1$

Use algebra tiles to model the substitution and evaluation of the following expression, for the given replacement value.

$2x + 4$, when $x = 1$

Use two rectangles to represent $2x$.

Use four blue squares to represent 4 .

Next

To represent the expression " $2x + 4$ ":


- Use two rectangles to represent $2x$.
- Use four blue squares to represent 4 .


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Example 2 (continued)

Key

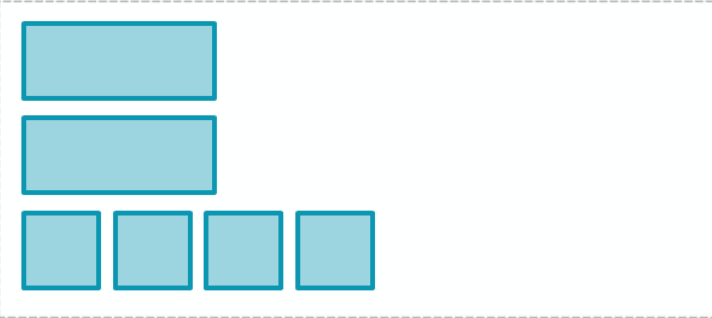
 = x

 = 1

 = -1

Use algebra tiles to model the substitution and evaluation of the following expression, for the given replacement value.

$2x + 4$, when $x = 1$



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

Now perform the substitution. The problem states that x is equal to 1, so replace each rectangle with the appropriate tile.

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


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Example 2 (continued)

The interface is a white rectangular area with a blue border. On the left, a pink header labeled "Key" contains three items: a large blue rectangle labeled "= x", a small blue square labeled "= 1", and a red square labeled "= -1". To the right, a text prompt asks to use algebra tiles to model the expression $2x + 4$ when $x = 1$. Below this, a pink-bordered box contains a diagram of algebra tiles: two blue squares stacked vertically, and a row of four blue squares below them. A pink text box inside this area explains that since $x = 1$, each rectangle should be replaced by one blue square. A pink "Next" button is located at the bottom right of the interface.

Key



 = x

 = 1

 = -1

Use algebra tiles to model the substitution and evaluation of the following expression, for the given replacement value.

$2x + 4$, when $x = 1$

In this example, $x = 1$. Therefore, you must replace each rectangle with one blue square.

Next


In this example, you must evaluate " $2x + 4$ " when $x = 1$. Therefore, you must replace each rectangle with one blue square.


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Example 2 (continued)

Key

 = x







 = 1





 = -1

Use algebra tiles to model the substitution and evaluation of the following expression, for the given replacement value.

$2x + 4$, when $x = 1$

When $x = 1$, $2x + 4$ has a value of _____.

Click the number above that correctly completes the statement.

Now simplify. After performing the substitution, your model includes six tiles that each represent a value of +1. Therefore, when $x = 1$, the expression " $2x + 4$ " has a value of ?


Click the number above that correctly completes the statement.


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Example 2 (continued)

Key

 = x

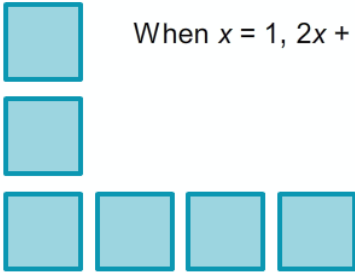
 = 1


 = -1

Use algebra tiles to model the substitution and evaluation of the following expression, for the given replacement value.

$2x + 4$, when $x = 1$

When $x = 1$, $2x + 4$ has a value of _____.





There are 6 tiles and each has a value of 1. The final result is 6.


Menu

There are six tiles remaining and each has a value of 1. The final result is 6.

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Self-Check

 **Self-Check**

Which answer correctly models the substitution and evaluation of the expression below?

$3x + 1$, when $x = -2$

A

B


C


D


SUBMIT

Click Here to See the Answer Choices

Key

 = x

 = 1

 = -1

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

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Self-Check: Answer


Click Here to See the Key

Correct

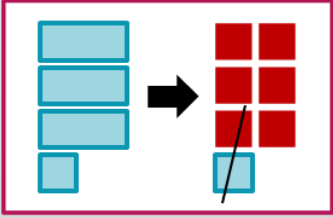
That's correct! Begin by modeling the expression $3x + 1$.



In this problem, $x = -2$. So replace each rectangle with two red squares.



Because the remaining tiles represent both positive and negative values of 1, you can simplify using your knowledge of zero pairs. When the one zero pair is eliminated, five red squares remain. Therefore, when $x = -2$, the expression $3x + 1$ has a value of -5 . This is represented by the model below.



C

Continue

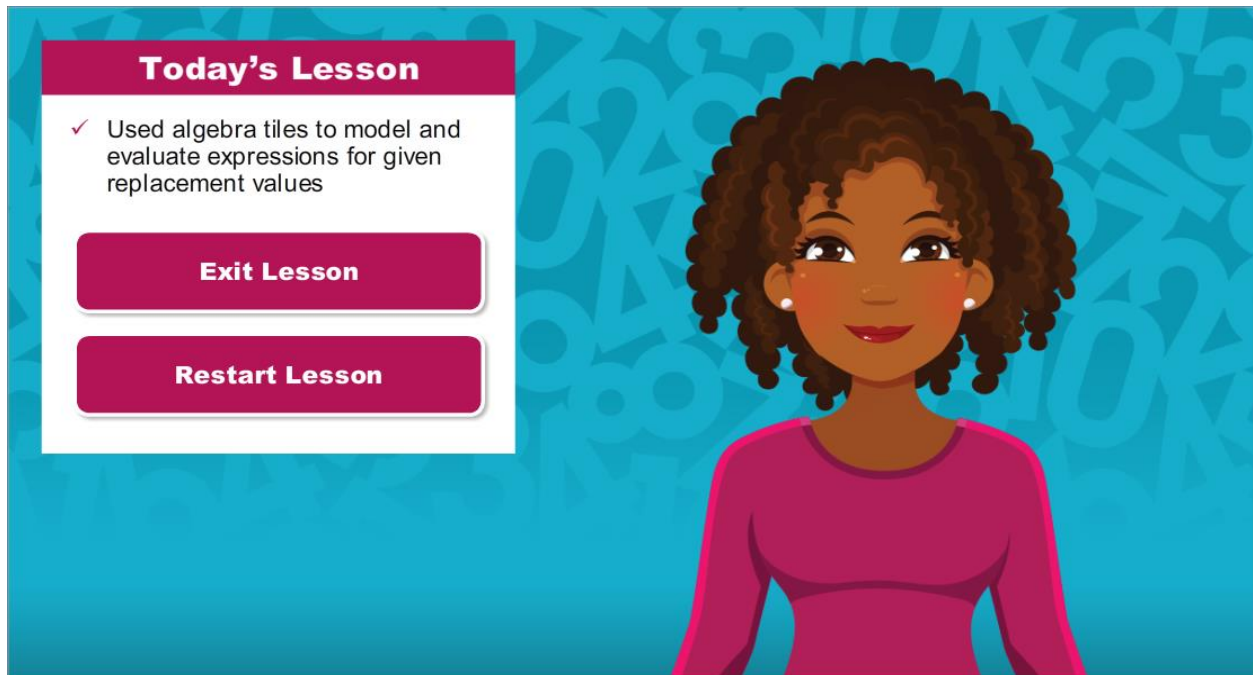
SUBMIT **C** **D**

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

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Conclusion



The image shows a digital interface for the conclusion of a lesson. On the left, a white box with a pink header titled "Today's Lesson" contains a checkmark and the text "Used algebra tiles to model and evaluate expressions for given replacement values". Below this are two pink buttons: "Exit Lesson" and "Restart Lesson". On the right, a cartoon illustration of a young woman with curly brown hair and a pink shirt is set against a blue background with a pattern of algebra tiles.

Congratulations! You have reached the conclusion of this lesson in Algebra I. You are now well-skilled in how to use algebra tiles to model and evaluate algebraic expressions for given replacement values.