Today's Objectives:

- Students will practice using different interpretations of "minus" as they represent negatives with algebra tiles.
- Students will build and simplify algebraic expressions using algebra tiles.
- Students will use expression comparison mats to determine whether two expressions are the same or different.

2.1.5 Using Algebra Tiles to Simplify Algebraic Expressions

Infinite Cloners

Which is greater: 58 or 62? That question might seem easy, because the numbers are ready to be compared. However, if you are asked which is greater, $2x + 8 = x - 3$ or $6 - x + 1$, the answer is not so obvious! In this lesson, you and your teammates will investigate how to compare two algebraic expressions and decide if they are equal.

For each expression below:
- Use an expression mat to build the expression.
- Find a different way to represent the same expression using tiles.

a. $7x - 3$

b. $-(2x + 6) + 3x$
AC 2.1.5 Using Algebra Tiles to Simplify Algebraic Expressions

Two expressions can be represented at the same time using an expression comparison mat. The expression comparison mat places expression stmt side-by-side so you can compare them and see which is greater. For example, in the picture at right, the expression on the left represents -3, but the expression on the right represents -2. Since -2 > -3, the expression on the right is greater.

Build the expression comparison mat shown at right. Write an expression that represents each side of the expression mat.

a. Can you simplify each of the expressions so that fewer tiles are used? Develop a method to simplify both sides of the expression comparison mat. Why does it work? Be prepared to justify your method to the class.

b. Which side of the expression comparison mat do you think is greater than the largest value? Agree on an answer as a team. Make sure each person in your team is ready to justify your conclusion to the class.

An organizing tool used to visually represent an expression with algebra tiles.
2.49. As Karl simplified some algebraic expressions, he recorded his work on the diagrams below.

- Explain in writing what he did to each expression comparison mat on the left to get the expression comparison mat on the right.
- If necessary, simplify further to determine which expression mat is greater. How can you tell if your final answer is correct?

**Reason:**

1. **Eliminate Zeros**
2. **Flipped Tiles**
3. **Balanced Both Sides of the Mat**

**Diagram:**

- a. 
  - Left: 
  - Right: 
  - Which is greater?
- b. 
  - Left: 
  - Right: 
  - Which is greater?
- c. 
  - Left: 
  - Right: 
  - Which is greater?

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2.50. Use Karl’s “legal” simplification moves to determine which side of each expression comparison mat is greater. Record each of your “legal” moves on the Lesson 2.1.5A Reference Pages by drawing or if the way Karl did in problem 2.49. After each expression is simplified, state which side is greater than the largest value. Be prepared to show your process and reasoning with the class.

**Diagram:**

- a. 
  - Expression Comparison Mat: 
  - Left: 
  - Right: 
  - Which is greater?
  - \(3 = 3\)
- b. 
  - Expression Comparison Mat: 
  - Left: 
  - Right: 
  - Which is greater?
  - \(1 < 3\)
AC 2.1.5 Using Algebra Tiles to Simplify Algebraic Expressions

METHODS AND MEANINGS

Combining Like Terms

Combining tiles that have the same area to write a simpler expression is called combining like terms. See the example shown at right:

When you are not working with actual tiles, it can help to picture the tiles in your mind. You can use these images to combine the terms that are the same. Here are two examples:

Example 1: \(2x^2 + xy + y^2 + x + 3 + x^2 + 3xy + 2\)  \(\Rightarrow\)  \(3x^2 + 4xy + y^2 + x + 5\)

Example 2: \(3x^2 - 2x + 7 - 5x^2 + 3x - 2\)  \(\Rightarrow\)  \(-2x^2 + x + 5\)

A term is an algebraic expression that is a single number, a single variable, or the product of numerals and variables. The simplified algebraic expression in Example 2 above contains three terms. The first term is \(-2x^2\), the second term is \(x\), and the third term is \(5\).

Learning Log

2-51. In your Learning Log, explain each of the types of “legal” moves that you can use to simplify and compare expressions. For each type of “legal” move, sketch an example. Title this entry “Legal Moves for Simplifying and Comparing Expressions” and include today’s date.

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Attachments

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