LESSON MAKER PRO

Tile Expression Lab

Use algebra tiles to show equivalent expressions.

GRADE 7 · 7.PFA.2.b

7.PFA.2.b "Represent equivalent algebraic expressions in one variable using concrete manipulatives and pictorial representations (e.g., colored chips, algebra tiles)."

NAME _____ DATE _____

BUILD AND COMBINE

A positive x-tile represents x, and a negative x-tile represents -x. A positive unit tile represents 1, and a negative unit tile represents -1. Count like tiles together to write one equivalent expression. For Apply 1, the teacher supplies five long paper rectangles labeled +x, two small squares labeled +1 and one matching small square labeled −1. Reuse the pieces to build and draw the model.

WORKED EXAMPLE

A tile mat has 4 positive x-tiles and 3 negative unit tiles. Write the expression represented by the tiles.

1. Count the positive x-tiles: 4x.
2. Count the negative unit tiles: -3.
3. Combine the tile values: 4x - 3.

Answer: 4x - 3

PRACTICE 6 problems

1 A tile mat has 5 positive x-tiles and 2 positive unit tiles. Write the expression represented by the tiles.

ANSWER _____

2 A tile mat has 7 positive x-tiles and 1 negative unit tile. Write the expression represented by the tiles.

ANSWER _____

3 A tile mat starts with 8 positive x-tiles and 9 positive unit tiles. Then 2 positive x-tiles and 1 positive unit tile are removed. Write the equivalent simplified expression.

ANSWER _____

4 Which tile collection represents 6x - 7? Collection A has 6 negative x-tiles and 7 positive unit tiles. Collection B has 6 positive x-tiles and 7 negative unit tiles.

ANSWER _____

5 Represent 8x - 5 with algebra tiles. State how many positive x-tiles and how many negative unit tiles you need.

ANSWER _____

_____

6 A tile mat has 9 positive x-tiles, 2 negative x-tiles, and 1 positive unit tile. Remove zero pairs and write the simplified expression.

ANSWER _____

APPLY IT Show your work

1 In a video game, each completed level earns x gems. Kai completes 5 levels, finds 2 bonus gems, and then loses 1 gem in a trap. Use the teacher-supplied paper tiles to actually arrange 5 positive x-tiles, 2 positive unit tiles and 1 negative unit tile on a mat. Draw and label your starting arrangement here or on extra paper, and write its expression. Physically remove one positive/negative unit zero pair. Draw the remaining arrangement, then write the equivalent simplified expression. Show both your tile arrangement and drawings to the teacher.

WORK SPACE

ANSWER _____

2 At a music club, Jada earns x points for each song she helps organize. Her tile model has 7 positive x-tiles and 5 negative unit tiles. Malik writes 2x + 5x - 5. Are Jada's model and Malik's expression equivalent? Explain with a simplified expression.

WORK SPACE

ANSWER _____

CHALLENGE One step up

A tile mat has 9 positive x-tiles, 2 negative x-tiles, 8 positive unit tiles, and 6 negative unit tiles. Remove all zero pairs. Write the simplified expression and explain which tiles made zero pairs.

WORK SPACE AND ANSWER

ANSWER KEY

Tile Expression Lab

GRADE 7 · 7.PFA.2.b

PART 1 · PRACTICE

#	PROBLEM	ANSWER
1	A tile mat has 5 positive x-tiles and 2 positive unit tiles. Write the expression represented by the tiles.	**5x + 2**
2	A tile mat has 7 positive x-tiles and 1 negative unit tile. Write the expression represented by the tiles.	**7x - 1**
3	A tile mat starts with 8 positive x-tiles and 9 positive unit tiles. Then 2 positive x-tiles and 1 positive unit tile are removed. Write the equivalent simplified expression.	**6x + 8**
4	Which tile collection represents 6x - 7? Collection A has 6 negative x-tiles and 7 positive unit tiles. Collection B has 6 positive x-tiles and 7 negative unit tiles.	**Collection B**
5	Represent 8x - 5 with algebra tiles. State how many positive x-tiles and how many negative unit tiles you need.	**8 positive x-tiles and 5 negative unit tiles**
6	A tile mat has 9 positive x-tiles, 2 negative x-tiles, and 1 positive unit tile. Remove zero pairs and write the simplified expression.	**7x + 1**

PART 2 · APPLY IT

1. **5x + 2 - 1 = 5x + 1** Check the actual paper arrangement and both labeled drawings. Initially five +x rectangles, two +1 squares and one −1 square represent 5x + 2 − 1. Removing one +1/−1 zero pair leaves five +x rectangles and one +1 square: 5x + 1. Counts alone without the build and drawings are incomplete.
2. **Yes. Both are equivalent to 7x - 5.** Jada's tiles represent 7x - 5. Combine 2x and 5x in Malik's expression to get 7x - 5.

CHALLENGE

7x + 2. Two positive x-tiles pair with two negative x-tiles, and six positive unit tiles pair with six negative unit tiles.

Accept equivalent expressions with terms in a different order, such as 2 + 7x for 7x + 2. A zero pair is one positive tile and one matching negative tile. Supply the eight labeled paper pieces before Apply 1 and observe actual manipulation, not only a proposed description. Check both pictorial representations and their matching equivalent expressions. Adult-precut reusable pieces are sufficient; no special commercial tiles are required.