LESSON MAKER PRO

Tile Signs and Groups

Model and expand expressions with algebra tiles.

GRADE 8 · 8.PFA.1.a

8.PFA.1.a "Represent algebraic expressions using concrete manipulatives or pictorial representations (e.g., colored chips, algebra tiles), including expressions that apply the distributive property."

NAME _____ DATE _____

BUILD EQUAL TILE GROUPS

For a(b + c), use |a| equal groups. In each group, represent each term with the appropriate number and type of tiles, then give every tile the sign found by multiplying the sign of a and the sign of that term. Combine like tiles from all groups to write an equivalent expression.

WORKED EXAMPLE

Use algebra tiles to model and expand -4(2x - 3).

1. |-4| = 4, so make 4 equal groups.
2. Because the multiplier is negative, each group has 2 negative x-tiles and 3 positive unit tiles.
3. Combine all groups: 8 negative x-tiles and 12 positive unit tiles.

Answer: -8x + 12

PRACTICE 6 problems

1 Use algebra tiles to model 5(x + 6). Describe the total tiles and write the expanded expression.

ANSWER _____

2 Use algebra tiles to model -7(x - 8). Describe the total tiles and write the expanded expression.

ANSWER _____

3 Use algebra tiles to model 9(-x + 10). Describe the total tiles and write the expanded expression.

ANSWER _____

4 Use algebra tiles to model 11(x - 12). Describe the total tiles and write the expanded expression.

ANSWER _____

5 Use algebra tiles to model -13(-x + 14). Describe the total tiles and write the expanded expression.

ANSWER _____

_____

6 Use algebra tiles to model 15(6x - 19). Describe the total tiles and write the expanded expression.

ANSWER _____

_____

APPLY IT Show your work

1 The art club packs 8 identical giveaway bags. Each bag has x sticker sheets and 9 buttons. Use an algebra-tile model to represent the total items, then write an expanded expression for the total number of items.

WORK SPACE

ANSWER _____

2 A school store cancels 12 identical online orders. Each canceled order had x posters and 7 badges. Use an algebra-tile model to represent the change in the number of items in outstanding orders, then write an expanded expression. This records canceled demand; no items are moved into or out of stock.

WORK SPACE

ANSWER _____

CHALLENGE One step up

A student says that -18(x - 20) is modeled by 18 negative x-tiles and 360 negative unit tiles. Is the student correct? Explain the signs of both tile types and write the expanded expression.

WORK SPACE AND ANSWER

ANSWER KEY

Tile Signs and Groups

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PART 1 · PRACTICE

#	PROBLEM	ANSWER
1	Use algebra tiles to model 5(x + 6). Describe the total tiles and write the expanded expression.	**5 positive x-tiles and 30 positive unit tiles; 5x + 30**
2	Use algebra tiles to model -7(x - 8). Describe the total tiles and write the expanded expression.	**7 negative x-tiles and 56 positive unit tiles; -7x + 56**
3	Use algebra tiles to model 9(-x + 10). Describe the total tiles and write the expanded expression.	**9 negative x-tiles and 90 positive unit tiles; -9x + 90**
4	Use algebra tiles to model 11(x - 12). Describe the total tiles and write the expanded expression.	**11 positive x-tiles and 132 negative unit tiles; 11x - 132**
5	Use algebra tiles to model -13(-x + 14). Describe the total tiles and write the expanded expression.	**13 positive x-tiles and 182 negative unit tiles; 13x - 182**
6	Use algebra tiles to model 15(6x - 19). Describe the total tiles and write the expanded expression.	**90 positive x-tiles and 285 negative unit tiles; 90x - 285**

PART 2 · APPLY IT

1. **8 positive x-tiles and 72 positive unit tiles; 8x + 72** Model 8 equal groups, each with one positive x-tile and 9 positive unit tiles. Combine the tiles from all bags.
2. **12 negative x-tiles and 84 negative unit tiles; -12x - 84** The canceled orders remove 12 groups of requested items from outstanding demand: −12(x + 7) = −12x − 84. Model 12 negative x-tiles and 84 negative unit tiles. This is a decrease in ordered items, not an inventory movement.

CHALLENGE

The student is not correct. The model has 18 negative x-tiles and 360 positive unit tiles because a negative multiplier times a negative unit term is positive. The expanded expression is -18x + 360.

Accept equivalent tile descriptions, such as “negative x-tiles” or “-x tiles,” when the counts and signs are correct. Accept equivalent expanded expressions with terms written in either order.