GR4.2 Modeling Two-Step Equations

Engage

ESSENTIAL QUESTION

How can you model two-step equations? I can use algebra tiles to model two-step equations.

Motivate the Lesson
Ask: You have used algebra tiles to model algebraic expressions. How do you think the algebra tiles might be used to model equations? Begin the Explore Activity to find out.

Explore

EXPLORE ACTIVITY

Focus on Communication   Mathematical Processes and Practices
Since positive signs and negative signs are found on more than one algebra tile, remind students to use descriptive terms when talking about the tiles. Using the phrases "positive variable tile" and "−1" tile," will make talking about their models easier.

Explain

YOUR TURN   Questioning Strategies
- What tiles do you use to model the left side of the equation? Where do you put the models? Use four positive variable tiles and two −1-tiles. These tiles go in the left box on the mat.
- What part of the mat represents the equal sign? the center line
- What tiles do you use to model the right side of the equation? Where do you put the models? Use six +1-tiles. These tiles go in the right box on the mat.

? ESSENTIAL QUESTION   How can you model two-step equations?

EXPLORE ACTIVITY

You can use algebra tiles to model two-step equations.

KEY
- ▭ = positive variable
- ▭ = negative variable
- ▦ = 1   ▦ = −1

Use algebra tiles to model $-2x + 3 = -3$.

A What tiles would you use to model the left side of the equation, $-2x + 3$?

Use __2__ negative variable tiles and __3__ +1-tiles.

B What tiles would you use to model the right side of the equation, -3?
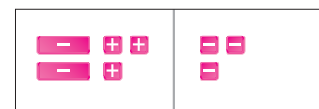
Use __3__ −1-tiles.

C You can use the mat to model the equation. What part of the equation does the line on the mat represent?

the equal sign

Use algebra tiles or draw the tiles to model the equation on the mat.
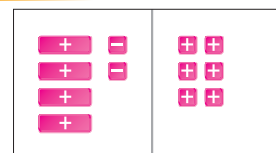
REFLECT

1. How would the model in the Explore Activity change for the equation $-4x + 3 = 3$?

On the left, use four negative variable tiles instead of two. On the right, replace the three −1-tiles with three +1-tiles.

YOUR TURN

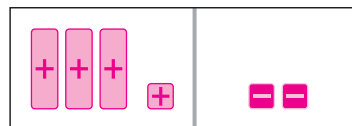**2.** Draw algebra tiles to model the equation $4x - 2 = 6$.
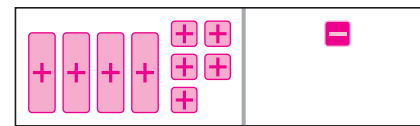
Getting Ready Lesson 4.2   40

ADDITIONAL PRACTICE

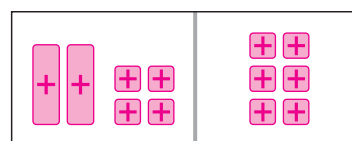**Draw algebra tiles to model the given two-step equations.**
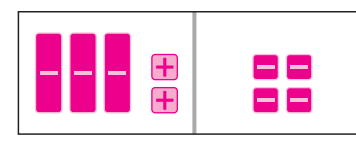
1. $3x + 1 = -2$
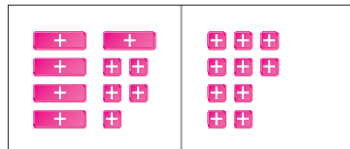
2. $4x + 5 = -1$

3. $2x + 4 = 6$

4. $-3x + 2 = -4$

Guided Practice

Use algebra tiles to model $5x + 5 = 10$.

1. How can you model the left side of the equation?

Use five positive variable tiles and five $+1$-tiles to model $5x + 5$.

2. How can you model the right side of the equation?

Use 10 $+1$-tiles to model 10.

3. Draw the algebra tiles to model the equation on the mat.
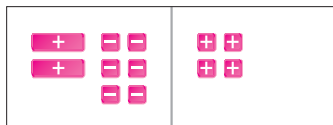

? ESSENTIAL QUESTION CHECK-IN

4. How can algebra tiles represent an equation?

Sample answer: Use a divided mat, where the left side represents the left side of the equation and the right side represents the right side of the equation. Use tiles to represent both sides.
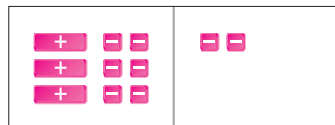
Independent Practice

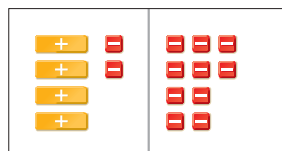**Draw algebra tiles to model the given two-step equation.**

5. $2x - 6 = 4$

6. $3x - 6 = -2$

7. What equation is modeled by the algebra tiles shown on the mat? Explain.

$4x - 2 = -10$; four positive variable tiles and two -1-tiles on the left to model $4x - 2$, the center line models the equal sign, ten -1-tiles on the right to represent -10.

41

Getting Ready Lesson 4.2

H.O.T. FOCUS ON HIGHER ORDER THINKING

1. **Analyze Relationships** How are the models for the equations $4x + 2 = -2$ and $-4x - 2 = 2$ similar? What do you think this means about the solutions of the equations? Sample answer: They use the same number of opposite tiles. This means they should have the same solution. **DOK 3; MP.4**

2. **Analyze Relationships** Consider the equation $3x + 2 = 5x$. Explain how you would model the equation. How is it similar to the two-step equations you have modeled in the lesson? How is it different? Use 3 positive variable tiles and two $+1$-tiles on the left. Use 5 positive variable tiles on the right. Both types use algebra tiles to model but for this one, there are variable tiles, rather than constant tiles, on both sides. **DOK 3; MP.4**

Elaborate

Talk About It
Summarize the Lesson

Ask: Why is it helpful to model an expression with algebra tiles? Modeling the expression is having a picture of the problem and helping visualize the steps needed to solve.

GUIDED PRACTICE
Avoid Common Errors

Exercise 3 Remind students to model each side separately rather than selecting all the tiles needed at once so they do not confuse the tiles. For example, model the left hand side completely before modeling the right hand side. This will also serve to remind them which part of the mat to use.
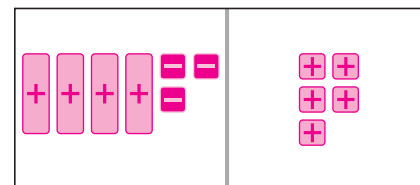
Evaluate

LESSON QUIZ

Draw algebra tiles to model the given two-step equations.

1. $-2x + 6 = 2$

2. $4x - 3 = 5$

3. $-3x - 4 = 2$