Objective   Modeling Equations as Equal Expressions

Warm-Up

Write each phrase as a mathematical expression.

1. half as many as 7 more than a number

2. an amount, shared equally with 5 people

In a small town, there are two main sections called the Hill Section and the Lake Section. The town has a population of 3496. The number of people who live in the Hill Section is 295 more than twice the number of people who live in the Lake Section.

1. Draw a bar model to represent this situation.

2. Use your model to write an equation that represents the situation.

3. How many people live in each section of town? Use your model to help you solve the problem.

4. Explain how the solution is represented in the equation.

The members of a small town's local arts council are selling raffle tickets. The art council decides that the top three raffle ticket sellers will share a portion of the profits. The second-place seller will receive twice as much as the third-place seller. The first-place seller will receive $20 more than the second-place seller. The profit portion they will share is $200.

5. Draw a bar model to represent this situation.

6. Use your model to write an equation that represents the situation.

7. How much will each of the top three sellers receive? Use your model to help you solve the problem.

8. Explain how the solution is represented in the equation.

Drew is 3 years younger than his brother, Jimmy. The sum of the brothers' ages is 21.

1. Draw a bar model to represent this situation.

2. Use your model to write an equation that represents the situation.

3. How old are Jimmy and Drew? Use your model to help you solve the problem.

4. Explain how the solution is represented in the equation.

Consider the Possibilities!

Think about all the equations you modeled and solved in this lesson.

- $2x + 4 = 10$
- $3x + 60 = 450$
- $5p + 20 = 200$

- $2j + 10 = 46$
- $3p + 295 = 3496$
- $2j - 3 = 21$

1. How are all of these equations similar in structure?

2. What does it mean to solve an equation?

LESSON 8.1b
Picture Algebra

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Practice

1. The Sharks Aquatic Club recently held a fundraiser to raise money for a local charity. The swimmers received money for each lap that they swam during a one-week period. The three swimmers who raised the most money were Rita, John, and Rodell. Together they swam a total of 2125 laps. John swam three times as many laps as Rita, and Rodell swam 25 more laps than John. How many laps did each swimmer swim?

a. Draw a picture to represent the situation. Label the unknown parts with variables and the known parts with their values.

b. Determine the number of laps each person swam using the picture you created. Explain your reasoning.

c. Write an expression for the number of laps each person swam. Let L represent the number of laps swum by Rita.

d. Write an equation to represent this situation.

e. If the swimmers received $2 for every lap they swam, how much did each swimmer earn for charity?