LESSON 2.4

Problem Solving Workshop: Using Alternative Methods

For use with the lesson "Solve Multi-Step Equations"

Another Way to Solve Example 5

Multiple Representations
In Example 5, you saw how to solve a problem about bird migration using a verbal model. You can also solve the problem by *solving a simpler problem*.

PROBLEM **Bird Migration** A flock of cranes migrates from Canada to Texas. The cranes take 14 days (336 hours) to travel 2500 miles. The cranes fly at an average speed of 25 miles per hour. How many hours of the migration are the cranes *not* flying?

METHOD **Solving a Simpler Problem** You can solve the problem by solving a simpler problem.

STEP 1 **Write** an equation for the amount of time the cranes are flying. Let h be the amount of time the cranes are flying.

$$
\boxed{\begin{array}{c}\text{Distance}\\\text{(miles)}\end{array}} = \boxed{\begin{array}{c}\text{Rate}\\\text{(miles/hour)}\end{array}} \cdot \boxed{\begin{array}{c}\text{Time spent flying}\\\text{(hours)}\end{array}}
$$

$$2500 \quad = \quad 25 \quad \cdot \quad h$$

An equation for the amount of time the cranes are flying is $2500 = 25h$.

STEP 2 **Find** the amount of time the cranes are flying.

$2500 = 25h$ Write equation.

$100 = h$ Divide each side by 25.

The cranes were flying for 100 hours of the migration.

STEP 3 **Find** the amount of time the cranes were *not* flying by subtracting the length of time of the migration by the amount of time flying.

$336 - 100 = 236$

The cranes were *not* flying for 236 hours of the migration.

PRACTICE

1. **Swimming** Amanda swims at an average rate of 72 meters per minute. It takes her 36 minutes to finish 1800 meters with breaks. How many minutes did Amanda swim? How many minutes of breaks did she take? Solve this problem using two different methods.

2. **What If?** Suppose in Example 1 that Amanda wants to swim 2700 meters and finish in 45 minutes. How many minutes of breaks did she take?

3. **Jogging** Mark works out for 50 minutes by biking and jogging. He bikes at an average rate of 1200 feet per minute and jogs at an average rate of 900 feet per minute. He wants to travel a combined 10 miles (1 mile = 5280 feet). How many minutes did Mark spend jogging?

4. **Perimeter** The sides of a triangle have lengths $(3x + 1)$ feet, $(2x - 3)$ feet, and x feet. The perimeter of the triangle is 22 feet. Find the value of x.

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