Writing Equations that Represent Real-World Situations

Steps to Writing an Equation

- Read the problem and underline or highlight the key pieces of information
- Choose a variable to represent the unknown
- Write an equation using your chosen variable

Example One

The cost of going to the show includes admission plus refreshments. Suppose the admission is $7.50, a bag of popcorn cost $3.00 and four friends go to the show together. Find how many bags of popcorn the friends bought if the total cost for the group was $39.00.

Let $x = \text{number of bags of popcorn}$

Admission cost + Cost of popcorn = Total Cost

$$\$7.50 \cdot 4 + \$3x = 39$$

$$30 + 3x = 39$$

Example Two

You have $40 in your bank account. You earn $7 per hour working at Rutter's Farm Store. How many hours must you work until you have $131?

Let $h = \text{number of hours you need to work}$

To calculate how much you make, you need to multiply the number of hours you work times how much you make per hour. This needs to be added to how much you already have saved.

$$\$7 \cdot h + \$40 = \$131$$

$$7h + 40 = 131$$

Example Three

Mega Middle School sells wrapping paper to raise money for student activities. The school keeps half of all sales, minus $300 for prizes to top sellers. How much wrapping paper must be sold for the school to earn $5000?

Let $s = \text{sales}$

"half of all sales, minus $300" is key for this problem.

$$\frac{1}{2}s - 300 = 5000$$

Try These

Define a variable and write an equation for each problem.

1. Ms. Gadget's car broke down on the turnpike. Acme Towing charged $30 plus $3 per mile to tow the car. If Ms. Gadget paid $162, how far was the car towed?

2. Working as a waiter, Michael earns $6.50 per hour plus tips. Last night he received $36.50 in tips and earned a total of $65.75. How many hours did he work?

3. A banana has 80 calories. This is 5 calories less than one seventh of the calories in a banana split. How many calories are in a banana split?

4. The pressure on a scuba diver at sea level is 14.7 pounds per square inch (psi). The pressure increases 0.445 psi for each foot of depth. Suppose the pressure on a diver is 41.4 psi. How deep is she?

5. Mr. Kork sold his car for $8,400. This was $200 more than two fifths of what he had paid for the car originally. How much had Mr. Kork paid for the car?

6. A spring is 2 in. long with no weight suspended from it. For each ounce of weight, the spring stretches 0.3 in. until it reaches its maximum length of 8 in. How much weight must be added for the spring to reach its maximum length?

7. Jennifer lit a 12-inch candle and let it burn. She found that after each hour, the candle was $\frac{3}{4}$ in. shorter. If she let the candle burn until it was only 1 in. tall, how many hours did it burn?

8. As an airplane rises, the outside temperature drops 3.6°F for each 1000 feet of elevation gain. Suppose the outside temperature is 75°F on the ground when the plane takes off and −51°F at cruising altitude. How high is the plane then?

9. Snorkel and two friends rented three life jackets and a sailboat. The life jackets were $3 each and the boat was $12 an hour. The total cost was $81. For how many hours did they rent the sailboat?