

## Section 2.3 Applications of Linear Equations

To solve an applied problem, follow these steps:

1. **Read** the problem carefully.
2. **Assign a variable** to represent the unknown value. Generally the variable represents the quantity asked for in the question.
3. **Write an equation.**
4. **Solve** the equation.
5. **State the answer** in a complete sentence.

### Percent Problem

**Example 1:** 187.5 is 125% of some number. What is the number?

*Assign a variable:*

*Write an equation:*

*Solve:*

*State the answer:*

## Geometry Problem

**Example 2:** The length of a rectangle is 5 cm more than its width. The perimeter is 5 times the width. What are the dimensions of the rectangle? Be sure to define the variable, write an equation, solve the equation and write the solution in a complete sentence.

*Assign a variable:*

*Write an equation:*

*Solve:*

*State the answer:*

### Finding Unknown Numerical Quantities

**Example 3:** According to the Air Transportation Association of America, the Boeing B747-400 and the McDonnell Douglas L1011-100/200 are among the air carriers with the maximum passenger seating. The Boeing seats 110 more passengers than the McDonnell Douglas, and together the two models seat 696 passengers. Find the seating capacity of *each* model. Be sure to define the variable, write an equation, solve the equation and write the solution in a complete sentence.

*Assign a variable:*

*Write an equation:*

*Solve:*

*State the answer:*

Investment problem

**Example 4:** After winning the lottery, a man has \$34,000 to invest. He invests some at 17% and the balance in stocks at 20%. His total annual interest income is \$6545. Find the amount invested at each rate. Be sure to define the variable, write an equation, solve the equation and write the solution in a complete sentence.

Principle	Rate (as a decimal)	Time (in years)	Interest ( $I = PRT$ )

*Assign a variable:*

*Write an equation:*

*Solve:*

*State the answer:*

## Mixture Problem

**Example 5:** How many pounds of candy worth \$8 per pound should be mixed with 100 pounds of candy worth \$4 per pound to get a mixture that can be sold for \$7 per pound? Be sure to define the variable, write an equation, solve the equation and write the solution in a complete sentence.

	Pounds of Candy	Price <i>Per</i> Pound	Total Price of that kind of candy
Candy #1 (expensive)			
Candy #2 (cheap)			
Mixture			

*Assign a variable:*

*Write an equation:*

*Solve:*

*State the answer:*

Mixture Problem Where One Ingredient is Pure

**Example 6:** How much antifreeze must be added to 20 liters of 50% antifreeze solution to increase it to 60% antifreeze? Be sure to define the variable, write an equation, solve the equation and write the solution in a complete sentence.

Quantity	Total Liters	Percent of Antifreeze	Liters of Pure Antifreeze
Pure antifreeze			
Existing solution			
Mixture			

*Assign a variable:*

*Write an equation:*

*Solve:*

*State the answer:*