

**Notes 6.3**  
**Applications of Linear Equations**

**STRATEGY FOR SOLVING WORD PROBLEMS**

Step 1 Read the problem carefully several times until you can state in your own words what is given and what the problem is looking for. Let  $x$  (or any variable) represent one of the unknown quantities in the problem.

Step 2 If necessary, write expressions for any other unknown quantities in the problem in terms of  $x$ .

Step 3 Write an equation in  $x$  that models the verbal conditions of the problem.  
**(Review Table 6.2 p. 332 Algebraic Translations of English Phrases)**

Step 4 Solve the equation and answer the problem's question.

Step 5 Check the solution in the original wording of the problem, not in the equation obtained from the words.

Example 1

One number exceeds another by 18. The sum of the numbers is 84. What are the two numbers?

Example 2

When a number is decreased by 65% of itself, the result is 28. What is the number?

**For examples 3 and 4, write the English phrase as an algebraic expression. Then simplify the expression. Let  $x$  represent the number.**

Example 3

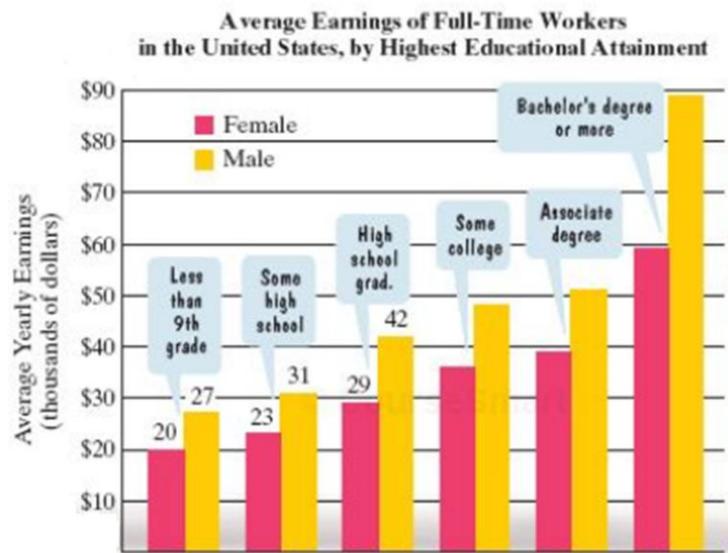
A number decreased by the difference between twelve and the number

### Example 4

Five decreased by four times the sum of a number and ten

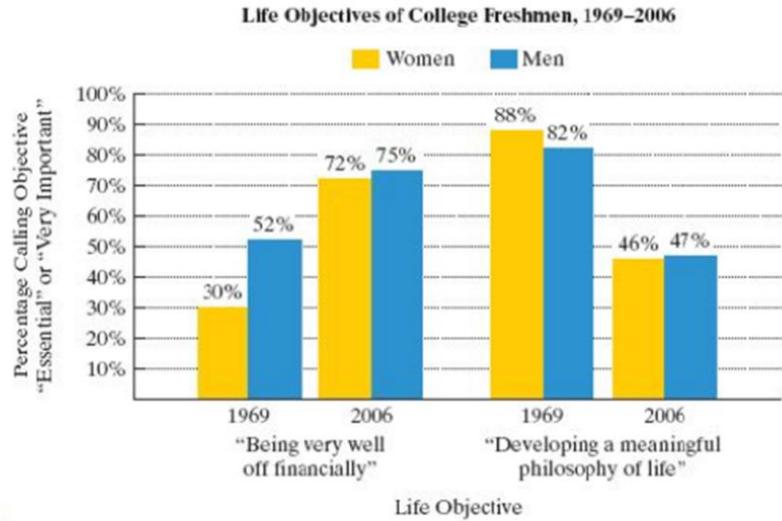
### Example 5

The average yearly salary of a woman with an associate degree exceeds that of a woman with some college by \$ 3 thousand. The average yearly salary of a woman with a bachelor's degree or more exceeds that of a woman with some college by \$ 23 thousand. Combined, three women with each of these educational attainments earn \$ 134 thousand. Find the average yearly salary of women with each of these levels of education.



### Example 6

The bar graph shows that the freshmen class of 2006 was less interested in developing a philosophy of life than the freshmen of 1969 had been. In 1969, 88% of the women considered this objective essential or very important. Since then, this percentage has decreased by approximately 1.1 each year. If this trend continues, by which year will only 33% of female freshmen consider “developing a meaningful philosophy of life” essential or very important?



### Example 7

You are choosing between two long- distance telephone plans. Plan A has a monthly fee of \$ 15 with a charge of \$ 0.08 per minute for all long-distance calls. Plan B has a monthly fee of \$ 3 with a charge of \$ 0.12 per minute for all long- distance calls. For how many minutes of long- distance calls will the costs for the two plans be the same?

Example 8

After a 30% price reduction, you purchase a new computer for \$ 840. What was the computer's price before the reduction?

Example 9

Solve the formula  $P = 2l + 2w$  for  $w$ .

Example 10

Solve the formula  $S = B + \frac{1}{2}Pl$  for  $P$ .

Example 11

Solve the formula  $A = P(1 + rt)$  for  $r$

Example 12

Solve the formula  $X = Y + AY$  for  $A$