

### Lesson 3-1

#### Example 1 Translate Sentences into Equations

Translate each sentence into an equation.

- a. Twice the sum of three and  $k$  is the same as twelve.

$$\underbrace{\text{twice}}_{2 \times} \quad \underbrace{\text{the sum of three and } k}_{(3 + k)} \quad \underbrace{\text{is the same as}}_{=} \quad \underbrace{\text{twelve}}_{12}$$

The equation is  $2(3+k) = 12$ .

- b. Two thirds  $m$  is as much as three times the sum of four and  $p$ .

$$\underbrace{\text{two thirds } m}_{\frac{2}{3}m} \quad \underbrace{\text{is as much as}}_{=} \quad \underbrace{\text{three}}_{3} \quad \underbrace{\text{times}}_{\times} \quad \underbrace{\text{the sum of four and } p}_{(4 + p)}$$

The equation is  $\frac{2}{3}m = 3(4+p)$ .

#### Example 2 Use the Four-Step Plan

Jordan's family is going to take a trip to Paris and visit the Eiffel Tower. The currency for France is the Euro which is written with a comma after two digits. The total cost for Jordan and his family will be 35,70 Euros. If the cost is 9,90 Euros for adults and 5,30 Euros for children to tour the tower, what is the total cost for the children?

**Explore** You know that Jordan's parents cost  $9,90 + 9,90 = 19,80$  Euros to tour the tower. You know that the total cost is 35,70 Euros. You want to find how much the children will cost.

**Plan** Write an equation to represent the situation. Let  $c$  represent the cost for the children.  
 $19,80 + c = 35,70$

**Solve**  $19,80 + c = 35,70$  Find  $c$  mentally by asking, "What number plus 19,80 equals 35,70?"  
 $c = 15,90$

It will cost 15,90 Euros for the children in Jordan's family to tour the Eiffel Tower.

**Examine** If 19,80 Euros is spent on the adults and 15,90 Euros is spent on the children, then  $19,80 + 15,90 = 35,70$  Euros will be spent total. The answer makes sense.

**Example 3 Write a Formula****Translate the sentence into a formula.**

The volume of a sphere is equal to four thirds times the product of pi and the cube of the radius.

**Words** Volume is equal to four thirds times the product of pi and the cube of the radius.**Variables** Let  $V$  = volume, and  $r$  = radius.**Formula**

$$\underbrace{\text{Volume}} \quad \underbrace{\text{is equal to}} \quad \underbrace{\text{four thirds}} \quad \underbrace{\text{times}} \quad \underbrace{\text{the product of pi and the cube of the radius}}$$

$$V \quad = \quad \frac{4}{3} \quad \times \quad \pi r^3$$

The formula for the volume of a sphere is  $V = \frac{4}{3} \times \pi r^3$ .**Example 4 Translate Equations into Sentence****Translate each equation into a verbal sentence.**

a.  $16 - \frac{1}{3}\ell = 13$

$$\underbrace{16} \quad \underbrace{-} \quad \underbrace{\frac{1}{3}\ell} \quad \underbrace{=} \quad \underbrace{13}$$

Sixteen minus one-third times  $\ell$  equals thirteen.

b.  $\frac{3}{7}(x + 7) = 3x$

$$\underbrace{\frac{3}{7}} \quad \underbrace{(x + 7)} \quad \underbrace{=} \quad \underbrace{3x}$$

Three sevenths times the sum of  $x$  and 7 is equal to three times  $x$ .

**Example 5 Write a Problem****Write a problem based on the given information.**

$$m = \text{miles driven on Friday} \quad m + 135 = \text{miles traveled on Saturday} \quad m + (m + 135) = 450$$

You know that  $m$  represents the number of miles driven on Friday and  $m + 135$  represents the miles driven on Saturday. The equation adds  $m$  plus  $m + 135$  to get 450. A sample problem is given below.

You take a trip over the weekend. You travel 135 more miles on Saturday than you did on Friday. The trip was a total of 450 miles. How far did you travel on Friday?