

Chapter 4 Writing Equations

Writing Equations from Word Problems:

1. Read and underline the problem carefully.
2. Identify the key words, operations and values in the problem.
3. Determine the unknown value.
4. Translate into an equation.
5. Solve.
6. Verify to be sure the number makes sense.
7. Answer the question fully to complete the problem including correct units.

Key words:

- | | | | |
|----|---|--------------|-----------------|
| + | • | more than | } reverse order |
| - | • | less than | |
| 2x | • | twice | |
| ÷ | • | divided into | |
| = | • | is | |
| ' | • | of | |

Ex. 1: Translate each sentence into a one-step equation. Solve and check your answer.

A. The sum of a number and twelve is -15.

Let $x =$ a number

$$x + 12 = -15$$

$$\begin{array}{r} x + 12 = -15 \\ -12 \quad -12 \\ \hline x = -27 \end{array}$$

The number is -27.

B. 35 is the difference of 25 and a number.

Let $x =$ a number

$$35 = 25 - x$$

$$\begin{array}{r} 35 - 25 = -x \\ 25 \quad -25 \\ \hline 10 = -x \end{array}$$

$$\frac{10}{-1} = \frac{-x}{-1} \quad x = -10$$

The number is -10.

C. The quotient of a number and negative five is -12.

Let $x =$ a number

$$\frac{x}{-5} = -12$$

$$\frac{-5}{-5} \cdot \frac{x}{-5} = -12 \cdot -5$$

$$x = 60$$

The number is 60.

D. Five less than a number is 20.

Let $x =$ a number

$$x - 5 = 20$$

$$\begin{array}{r} x - 5 = 20 \\ +5 \quad +5 \\ \hline x = 25 \end{array}$$

The number is 25.

E. Ten is 6 fewer than a number.

Let $x =$ a number

$$10 = x - 6$$

$$\begin{array}{r} 10 = x - 6 \\ +6 \quad +6 \\ \hline 16 = x \end{array}$$

$$16 = x \quad x = 16$$

The number is 16.

F. Forty-two is the product of a number and negative six.

Let $x =$ a number

$$42 = -6x$$

$$\frac{42}{-6} = \frac{-6x}{-6}$$

$$-7 = x \quad x = -7$$

The number is -7.

Ex. 2: Translate each sentence into a two-step equation. Solve and check your answer.

A. Two times the sum of a number and five is 36.

Let $x =$ a number

$$2(x + 5) = 36$$

$$2(x + 5) = 36$$

$$\begin{array}{r} 2x + 10 = 36 \\ -10 \quad -10 \\ \hline 2x = 26 \end{array}$$

$$\frac{2x}{2} = \frac{26}{2}$$

$$x = 13$$

The number is 13.

B. The quotient of a number and six, increased by eleven is negative nine.

Let $x =$ a number

$$\frac{x}{6} + 11 = -9$$

$$\begin{array}{r} \frac{x}{6} + 11 = -9 \\ -11 \quad -11 \\ \hline \frac{x}{6} = -20 \end{array}$$

$$\frac{6}{1} \cdot \frac{x}{6} = -20 \cdot 6$$

$$x = -120$$

The number is -120.

C. Five more than twice a number n is -25.

Let $n =$ a number

$$2n + 5 = -25$$

$$\begin{array}{r} 2n + 5 = -25 \\ -5 \quad -5 \\ \hline 2n = -30 \end{array}$$

$$\frac{2n}{2} = \frac{-30}{2}$$

$$n = -15$$

The number is -15.