

Steps for Problem Solving

- 1) UNDERSTAND the problem
  - Read and reread the problem
  - Choose a variable for the unknown
  - Draw a picture if one is not provided
  - Propose a solution and check that answer in the original problem
- 2) TRANSLATE the problem into an equation
- 3) SOLVE the equation
- 4) INTERPRET the solution
  - Check the answer in terms of the problem

**OBJECTIVE 1: Solving Direct Translation Problems**

**TASK 1: Finding an Unknown Number**

- a) Twice a number, added to seven, is the same as three subtracted from the number. Find the number.

$$\begin{array}{r} 7 + 2x = x - 3 \\ -x \quad \quad \quad -x \\ \hline 7 + x = -3 \\ -7 \quad \quad \quad -7 \\ \hline x = -10 \end{array}$$

- b) Three times a number minus 6, is the same as two times a number, plus 3. Find the number.

$$\begin{array}{r} 3x - 6 = 2x + 3 \\ -2x \quad \quad \quad -2x \\ \hline x - 6 = 3 \\ +6 \quad \quad \quad +6 \\ \hline x = 9 \end{array}$$

- c) Twice the sum of a number and 4 is the same as four times the number, decreased by 12. Find the number.

$$\begin{array}{r} 2(x + 4) = 4x - 12 \\ \frac{4x}{2} \quad \quad \quad -12 \\ \hline (x + 4) = 2x - 6 \\ +6 \quad \quad \quad +6 \\ \hline x + 10 = 2x \\ -x \quad \quad \quad -x \\ \hline 10 = x \end{array}$$

- d) Three times a number, decreased by four, is the same as double the difference of the number and one.

$$\begin{array}{r} 3x - 4 = 2(x - 1) \\ 3x - 4 = 2x - 2 \\ -2x \quad \quad \quad -2x \\ \hline x - 4 = -2 \\ +4 \quad \quad \quad +4 \\ \hline x = 2 \end{array}$$



### Objective 2: Solving Problems Involving Relationships among Unknown Quantities

#### TASK 2: Finding an Unknown Number

- a) Balsa wood sticks are commonly used for building models. A 48-inch balsa wood stick is to be cut into two pieces so that the longer piece is three times the shorter piece. Find the length of each piece.

$$x + 3x = 48$$

$$4x = 48$$

$$x = 12$$



- b) A 45-inch board is to be cut into two pieces so that the longer piece is four times the shorter. Find the length of each piece.

$$x + 4x = 45$$

$$5x = 45$$

$$x = 9$$



- c) The 114<sup>th</sup> Congress began on Jan. 3, 2015, and had a total of 435 Democratic & Republican representatives. There were 59 fewer Democratic representatives than Republican. Find the number of representatives from each party.

$$D + R = 435$$

$$D = R - 59$$

$$R + R - 59 = 435$$

$$2R - 59 = 435$$

$$2R = 494$$

$$R = 247 \quad D = 188$$

- d) In 2015, there were 7 fewer Democratic State Governors than Republican State Governors. Find the number of State Governors from each party. Alaska had an independent governor, so use a total of 49, representing the other 49 states.

$$D = R - 7$$

$$D + R = 49$$

$$D = 28 - 7$$

$$D = 21$$

$$R - 7 + R = 49$$

$$2R - 7 = 49$$

$$2R = 56$$

$$R = 28$$

- e) If the two walls of the Vietnam Veterans Memorial in Washington, D.C., were connected an isosceles triangle would be formed. The measure of the third angle is 97.5° more than the measure of either of the other two equal angles. Find the measure of the third angle.

$$x = 27.5$$

$$x + x + x + 97.5 = 180$$

$$3x + 97.5 = 180$$

$$3x = 82.5$$

$$125^\circ$$



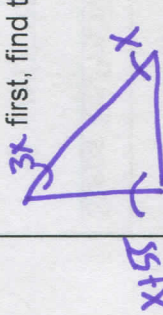
- f) The second angle of a triangle measures three times as large as the first. If the third angle measures 55° more than the first, find the measures of all three angles.

$$x + 3x + x + 55 = 180$$

$$5x + 55 = 180$$

$$5x = 125$$

$$x = 25$$



$$\begin{aligned} \text{1st } \angle &: 25^\circ \\ \text{2nd } \angle &: 75^\circ \\ \text{3rd } \angle &: 80^\circ \end{aligned}$$

Still need help with: