

## using algebra to solve word problems

**1****DECLARE VARIABLES**

Use "LET STATEMENTS" to define your variable.

**2****SET UP EQUATION & SOLVE**

Translate into an equation using your let statements. Then solve!

**3****DEFINE ANSWER**

Show exactly what the problem is asking for.

**TYPE A: Find "the number"**

1. The larger of two numbers is four more than the smaller number. If the sum of the numbers is 74, find the numbers.

Let "Table":

smaller #	$n = 35$
larger #	$n + 4 = 39$

$$35 + 4 = 39$$

(plug in "n" to find other #!)

$$(small) + (large) = 74$$

$$(n) + (n + 4) = 74$$

$$2n + 4 = 74 \quad *SOLVE!$$

$$\underline{-4} \quad \underline{-4}$$

$$\frac{2n}{2} = \frac{70}{2}$$

$$\boxed{n = 35}$$

2. The larger of two numbers is six less than twice the smaller number. If the sum of the numbers is 42, find the numbers.

smaller #	$n = 16$
larger #	$2n - 6 = 26$

$$2(16) - 6 = 26$$

\*check:  $16 + 26 = 42$   
 $42 = 42 \checkmark$

$$(small) + (large) = 42$$

$$(n) + (2n - 6) = 42$$

$$3n - 6 = 42$$

$$\underline{+6} \quad \underline{+6}$$

$$\frac{3n}{3} = \frac{48}{3}$$

$$\boxed{n = 16}$$

3. The larger of two numbers is seven less than three times the smaller number. If the sum of these numbers is 61, find the numbers.

smaller #	$n = 17$
larger #	$3n - 7 = 44$

$$3(17) - 7 = 44$$

\*check:  $17 + 44 = 61$   
 $61 = 61 \checkmark$

$$(small) + (large) = 61$$

$$(n) + (3n - 7) = 61$$

$$4n - 7 = 61$$

$$\underline{+7} \quad \underline{+7}$$

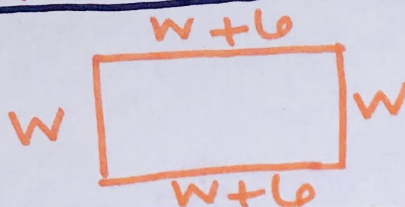
$$\frac{4n}{4} = \frac{68}{4}$$

$$\boxed{n = 17}$$

**TYPE B: Perimeter of Rectangles** Draw a diagram!

4. The length of a rectangle is six inches more than its width. If the perimeter of the rectangle is 24 inches, find its dimensions.

Length	$W + 6 = 9$ in
Width	$W = 3$ in



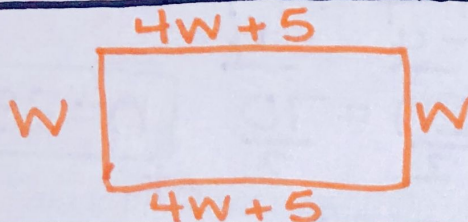
$$W + W + W + 6 + W + 6 = 24$$

$$4W + 12 = 24$$

$$\begin{array}{r} -12 \\ \hline 4W = 12 \\ \hline \frac{4W}{4} = \frac{12}{4} \\ \hline W = 3 \end{array}$$

5. The length of a rectangle is five inches more than four times its width. If the perimeter of the rectangle is 90 inches, find its dimensions.

Length	$4W + 5 = 37$ in
Width	$W = 8$ in



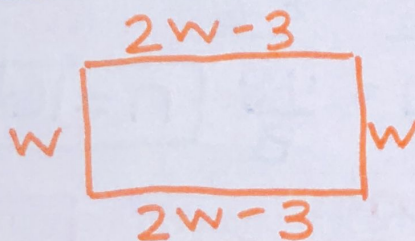
$$W + W + 4W + 5 + 4W + 5 = 90$$

$$10W + 10 = 90$$

$$\begin{array}{r} -10 \\ \hline 10W = 80 \\ \hline \frac{10W}{10} = \frac{80}{10} \\ \hline W = 8 \end{array}$$

6. The length of a rectangle is three centimeters less than twice its width. If the perimeter of the rectangle is 18 centimeters, find its dimensions.

Length	$2W - 3 = 5$ cm
Width	$W = 4$ cm



at end

$$W + W + 2W - 3 + 2W - 3 = 18$$

all four sides!

$$6W - 6 = 18$$

$$\begin{array}{r} +6 \\ \hline 6W = 24 \\ \hline \frac{6W}{6} = \frac{24}{6} \\ \hline W = 4 \end{array}$$

7. Kirk has \$12 less than Jim. If Jim spends half of his money, and Kirk spends none, then Kirk will have \$2 more than Jim. How much money did they both start with?

	Begin	End
Kirk	$J - 12$	$\frac{1}{2}J + 2$
Jim	$J$	$\frac{1}{2}J$

Kirk did not spend \$ so those must be equal.

$$J - 12 = \frac{1}{2}J + 2$$

$$\begin{array}{r} -\frac{1}{2}J \\ \hline \frac{1}{2}J - 12 = 2 \\ \hline \frac{1}{2}J = 14 \\ \hline \frac{1}{2}J = 14 \end{array}$$

$$(2) \frac{1}{2}J = 14 (2)$$

$$J = 28$$