

How to Work Word Problems

How do you start to work a word problem?

- ✓ *Read the problem* all the way through quickly to see what kind of word problem it is and what it is about.
- ✓ Look for a question at the end of the problem. This is often a good way to find what you are solving for. Sometimes two or three things need to be found.
- ✓ Start every problem with >>>"Let x = something."
(We generally use x for the unknown, or use a variable that stands for the thing you need to find, like m = money). You let x equal what you are trying to find. What you are trying to find is usually stated in the question at the end of the problem. This is called the *unknown*. You must show and label what x stands for in your problem, or your equation has no meaning.
- ✓ If you have to find more than one quantity or unknown, try to determine the *smallest* unknown (or the thing you have least information about). This unknown is often the one to let x equal.
- ✓ Go back and read the problem over again. This time read it one piece at a time. Simple problems generally have two statements. One statement helps you set up the unknowns, and the other gives you equation information. Translate the problem from words to symbols one piece at a time.

Some of the different types of word problems you are responsible for learning:

- Numbers
- Consecutive integers
- Time, rate, and distance
- Coins
- Age

Examples of number problems:

- 1) There are two numbers whose sum is 72.
One number is twice the other. What are the numbers?

$$\begin{array}{l} \text{Let } X = \text{one \#} \\ 2X = \text{the 2}^{\text{nd}} \# \end{array}$$

$$X + 2X = 72$$

$$\begin{array}{r} 3X = 72 \\ \hline \end{array}$$

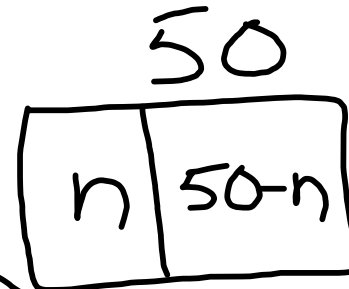
The 2 #'s are 24 + 48

$$\begin{array}{r} 3 \\ \hline X = 24 \end{array}$$

2) There are two numbers whose sum is 50.
Three times the first is 5 more than twice the second. What are the numbers?

Let $n = 1^{\text{st}} \#$

$50 - n = 2^{\text{nd}} \#$



$$3n = 5 + 2(50 - n)$$

$$3n = 5 + 100 - 2n$$

$$3n = 105 - 2n$$

$$+ 2n$$

$$+ 2n$$

$$\frac{5n = 105}{5} \quad \frac{5}{5}$$

$$n = 21$$

The 2 #'s are 21 & 29.

3) Separate 71 into 2 parts such that one part exceeds the other by 7. (*Hint: "Separate 71 into two parts" means two numbers have a sum of 71. "Such that" means in order to have or so that.*)

$$\text{Let } n = 1^{\text{st}} \#$$

$$71 - n = 2^{\text{nd}} \#$$

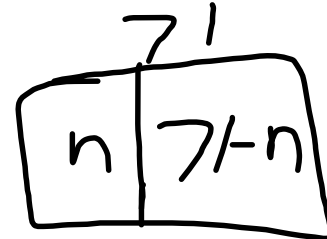
$$\begin{array}{r} n + 7 = 71 - n \\ + n \quad \quad + n \\ \hline \end{array}$$

$$\begin{array}{r} 2n + 7 = 71 \\ - 7 - 7 \\ \hline \end{array}$$

$$\begin{array}{r} 2n = 64 \\ \div 2 \quad \div 2 \\ \hline \end{array}$$

$$n = 32$$

1st # is 32
2nd # is 39



$$\begin{array}{r} n = 71 - n + 7 \\ + n \quad \quad + n \\ \hline \end{array}$$

$$\begin{array}{r} 2n = 78 \\ \div 2 \quad \div 2 \\ \hline \end{array}$$

$$n = 39$$

1st # is 39
2nd # is 32

Let n = the # _____

? 22, 28.

$$\begin{array}{r} n - 22 = 28 \\ + 22 \quad 22 \\ \hline n = 50 \end{array}$$

The # is 50.

? 34, 66.

$$\begin{array}{r} n + 34 = 66 \\ - 34 \quad - 34 \\ \hline n = 32 \end{array}$$

The # is 32.

? 16, 49.

$$\begin{array}{r} n - 16 = 33 \\ + 16 \quad + 16 \\ \hline n = 49 \end{array}$$

The # is 49

? 11, 21.

$$\begin{array}{r} n - 11 = 21 \\ + 11 \quad + 11 \\ \hline n = 32 \end{array}$$

The # is 32!

? 18 ?

$$\begin{array}{r} n - 18 = 6 \\ + 18 \quad 18 \\ \hline n = 24 \end{array}$$

? 67, 130.

$$\begin{array}{r} 67 + n = 130 \\ - 67 \quad - 67 \\ \hline n = 67 \end{array}$$

? 51 ?

$$\begin{array}{r} n + 51 = 90 \\ - 51 \quad - 51 \\ \hline n = 39 \end{array}$$

$$\begin{array}{r}
 3n + 12 = 36 \\
 -12 \quad -12 \\
 \hline
 3n = 24 \\
 \frac{3n}{3} = \frac{24}{3} = 8
 \end{array}$$

$$\begin{array}{r}
 9n + 79 = 169 \\
 -79 \quad -79 \\
 \hline
 9n = 90 \\
 \frac{9n}{9} = \frac{90}{9} = 10
 \end{array}$$

$$\begin{array}{r}
 67 + 10n = -207 \\
 -67 \quad -67 \\
 \hline
 10n = -274 \\
 \frac{10n}{10} = \frac{-274}{10} = -27.4
 \end{array}$$

$$10n + 73 = 923$$

$$\begin{array}{r}
 n - 222 = -140 \\
 +222 \quad +222 \\
 \hline
 n = 82
 \end{array}$$