DEFINING THE VARIABLE

How to Decide What to Define as the Variable(s)

1. Read the problem. Decide what unknown quantities are needed to solve the problem.
2. Identify what information is given about each unknown.
3. Select a variable (or variables). (Any letter of the alphabet will work. Sometimes it is helpful to use the first letter of the thing you are determining, i.e. w = width, p = price, h = height.) Set the variable equal to one of the unknowns. The unknown that works best, is the one that is used to describe the other unknowns.
4. Define the other unknowns using the variable(s) that you just defined.
5. Write the equation.

Example Using One Variable:

Problem: One number is six more than another number. The sum of the numbers is forty. Find the two numbers.
1. *Read the problem. Decide what unknown quantities are needed to solve the problem.*
   The unknown quantities are the two numbers, "one number" and "another number."
2. *Identify what information is given about each unknown.*
   "One number" is six more than "another number".
   Nothing is known about "another number." It is used to describe "one number".
3. *Select a variable. Set the variable equal to one of the unknowns.*
   We know nothing about "another number." Therefore, set the variable equal to "another number."
   Let n = another number
4. *Define the other unknowns using the variable that you just defined.*
   We know: "One number is six more than another number"
   Therefore: "One number" = $6 + n$ and   "another number" = n
5. *Write the equation.*
   "The sum of the numbers is forty."
   $n + (6 + n) = 40$

Example Using Two Variables (to do the same problem):

Problem: One number is six more than another number. The sum of the numbers is forty. Find the two numbers.
1. *Read the problem. Decide what unknown quantities are needed to solve the problem.*
   The unknown quantities are the two numbers, "one number" and "another number."
2. *Identify what information is given about each unknown.*
   Since two unknowns were identified and we plan to use two variables, we can skip this step.
3. *Select the variables. Set the variables equal to one of the unknowns.*
   Let a = "one number" and b = "another number".
4. *Define the other unknowns using the variable that you just defined.*
   There are no other unknowns so this step can be skipped.
5. *Write the equations.*
   "One number is six more than another number."   "The sum of the numbers is forty."
   $a = 6 + b$ $a + b = 40$

Reminder: You need the same number of variables as the number of equations and vice versa. Two variables require two equations. Three equations require three variables.