Equations

An ***equation*** has:

- an equal sign " = " and
- an expression on both sides of the equal sign.

Some equations are *true*, but others are *false*.
10 = 9 is a false equation. 6 + 6 = 12 is a true equation.

Examples of equations:

$2(a + 6) = y$ $\quad 14 = 9 + 5$

$9 = 8 + 8$ (a false equation) $\quad 0 = 0 \quad \frac{x + y}{2} = 5$

$5^2 - x = 2x + 7$

What do we do with equations?

If the equation has a variable (a letter) in it, then this is the *unknown*. We can try to *solve* the equation. This means finding the values of the unknown that make the equation true.

$6 + x = 60$ has the unknown x. If x is 54, then the equation is true: $6 + 54 = 60$.
(If we give some other value for x, say 67, we get a false equation. $6 + 67 = 60$ is a false equation.)

We say $x = 54$ is the *solution* or the *root* of the equation.

1. Label each as an equation or an expression.

a. $2x - 3 = 8 + x$ **b.** $y^2 - 9$ **c.** $4 + 2 = 6$ **d.** $\frac{1}{2}x^4 - 5$ **e.** $\frac{T + 2D}{C}$

2. Write the statements as equations. Use a letter for the unknown (the "secret number" or "a number"). Then solve the equations.

a. When you add 4 and a secret number, you get 10.

Equation: *4 + x = 10* Solution: *x = 6*

b. When a secret number is subtracted from 100, the difference is 35.

Equation: _____ Solution: _____

c. The product of 3 and a number is 63.

Equation: _____ Solution: _____

d. When you divide a number by 7, the result is 12.

Equation: _____ Solution: _____

e. The quotient of 60 and a secret number is equal to 12.

Equation: _____ Solution: _____