

Name:

Date:

Period:

There are 3 different types of solutions to an equation:

- One Solution
- No Solution
- Infinite Solutions

**Equations with One Solution:** An equation with **ONE SOLUTION** means that there is only **ONE** number you can replace the variable with in the equation that will make the equation true. When you solve and get  $x =$  a number (whether it is positive, negative, a fraction, a decimal, or zero), you have an equation with **one** solution.

Examples:

$$5x + 15 = 45 + 2x$$

$$2(3x + 7) = 2x + 8 + 3x$$

**Equations with No Solution:** Some equations have **NO SOLUTION**. An equation with **NO SOLUTION** means that there is **NO** number you can replace the variable with in the equation that will ever make the equation true. For example,  $w + 3 = w + 6$  has no solution because a number plus 3 cannot be equal to the same number plus 6. If you have the same exact variable on both sides of the equal sign and you are adding or subtracting different numbers to it, you have an equation with no solution.

Examples:

$$4x + 3 = 4x + 1$$

$$8z = 4(2z + 1)$$

$$2 - 15n = 5(-3n + 2)$$

$$5(1 + 4m) = 2(3 + 10m)$$

**Equations with an infinite number of solutions:** Some equations have **INFINITE SOLUTIONS**. An equation with **INFINITE SOLUTIONS** means that you can replace the variable in the equation with **ANY** number and it will **ALWAYS** be true. An equation that is true for all values of the variable is an identity.

Examples:

$$4(3x + 2) = 2(6x + 4)$$

$$12y + 6 = 6(2y + 1)$$

$$2(3g + 2) = \frac{1}{2}(12g + 8)$$

$$3(2a + 2) = 2(3a + 3)$$

Write 2 of your own examples of equations with  
NO SOLUTIONS:

(check them to make sure they are correct)

Write 2 of your own examples of equations with  
INFINITE SOLUTIONS:

1. \_\_\_\_\_

1. \_\_\_\_\_

2. \_\_\_\_\_

2. \_\_\_\_\_