**Linear**

**Inequalities**

**Solutions: One Solution with many points or No Solution**

**Inequality Systems are usually solved by graphing because it doesn’t make sense to do substitution and elimination.**

**With having 3 different signs to work with it makes it impossible to know what it would change to if you used either of those two methods.**

**Linear Systems are done by substitution, elimination, or graphing depending on how it is originally written/ or is easiest to solve.**

**Non-Linear Systems are also usually solved by graphing because you can’t really eliminate a variable if it was x2 very well. And it is hard to substitute in that case because you would have to probably do the quadratic formula. Also, it is much easier to visualize and move an x2 graph around to solve.**

**Systems of Equations**

**Ex:**

**Ex:**

**Non-Linear**

**No Solution**

**Substitution**

**Elimination**

**Graphing**

**Solutions:**

**Ex:**

**Ex:**

1. **Solve for 1 variable. x = 3y + 6**
2. **Put the solved equation into the equation solved for. 8x + 3y = 17 goes to**

**8 (3y + 6) + 3y = 17**

1. **Distribute and solve for y in this case to plug it back in to find x.**
2. **Make one variable equal to each other with opposite signs ex 2x+3y and -2x-6y**
3. **Cancel the variable out and as in both examples solve for y.**
4. **Once one variable is found plug it back into the equation to find the other**
5. **Put the equations into y = mx + b form**
6. **Graph on a paper**

**One Specific Point (2, 3)**

**All Reals**

**Y < 3x + 8**

**Y > -8x - 5**

**Y = 3x + 8**

**Y = -8x - 5**

**Ex:**

**Y = 3x 2 + 8**

**Y = -8x – 5**

**Solutions: One, Many or No solutions**

**Ex:**

**Ex:**

**Y = 3x + 8**

**Y= 3x - 6**

**y = 3x + 8**

**3y -8x = 5**

**y = 3x + 8**

**y = -8x = 5**

**4y + 3x = 18**

**3y - 8x = -7**

**2y + 8x = 8**

**3y -8x = 5**

**Ex:**

**Y = 3x + 8**

**3y - 9x = 15**

**Ex:**

These equations are written in y = mx + b form and are really easy so solve with graphing because this is the format to graph a line. This method of solving for systems is also used with non-linear systems and inequalities.

One variable is already solved so it is really easy to plug the solved equation into the second equation.

In this example, the 5y and -5y would cancel each other out so you could easily find x. In another general example you may have to multiply by a number to make them equal each other. Example 2y and 3y multiply both equation to make the y’s equal 6y.

y = 3x + 2

12x + 3y = 6

Answer = (0, 2)

4x - 5y = 18

6x + 5y = 2

Answer = (2, -2)

Substitution

Elimination

y = 3x + 5

y = -5x -3

Answer = (-1, 2)

Graphing

**Linear**