Lesson 1 Solving Linear Systems, Graphically

A *system of linear equations* is a set of two or more linear equations ($y = mx + b$) with the same variables (x and y).

The *solution of the system of linear equations* is the set of all ordered pairs that satisfy all the equations. Graphically, it is the point(s) where the two lines intersect.

There are 3 types of systems of linear equations:
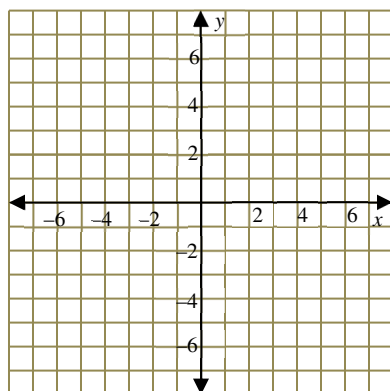
- Independent
- Inconsistent
- Dependent

Independent Systems are systems of equations that intersect at one point.

Example:
Solve, graphically

$$y = 3x + 2$$

$$2y = x - 6$$

The lines in this type of system have different slopes and intersect at 1 point. This point is the solution to the system.
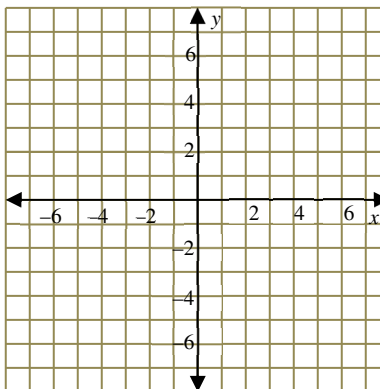
Inconsistent Systems are systems of equations that do not intersect. They have no solution.

Example:
Solve, graphically.

$$y = 2x + 2$$

$$y = 2x - 4$$

The lines in this type of system are parallel. They have the same slope and different y-intercepts. There is no solution to this system of equations since the lines never intersect.
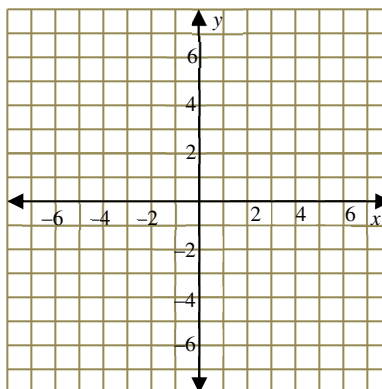
Dependent Systems: These are systems of equations that intersect at all points. They have an infinite number of solutions.

Example:
Solve, graphically.
$$3y = -6x + 3$$

$$y = -2x + 1$$

The equations represent the same line. Since they have the same slope and the same y-intercept, they are ***coincident lines,*** and have an infinite number of solutions.