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 — one point as a solution
- Inconsistent — no sol'n (parallel lines)
- Dependent — all points on the line (eqns represent the same line)

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

Example:
Solve, graphically

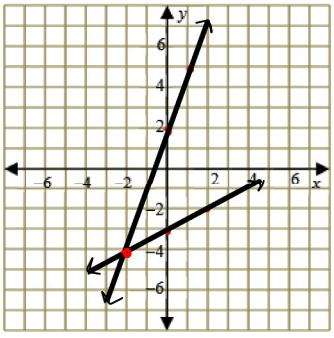
$y = 3x + 2$

$\frac{2y}{2} = \frac{x}{2} - \frac{6}{2}$ $\quad y = \frac{1}{2}x - 3$

$y = mx + b$

① Plot y-int

② Use slope to get 2nd point



sol'n $(-2, -4)$

The lines in this type of system have different slopes and intersect at 1 point. This point is the solution to the system.

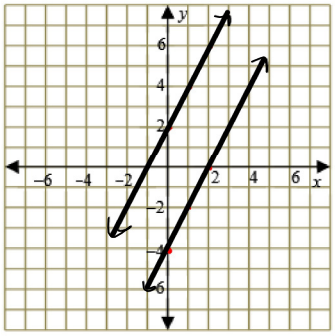
Inconsistent Systems are systems of equations that do not intersect. They have no solution.

Example:
Solve, graphically.

$y = 2x + 2$

$y = 2x - 4$

no sol'n



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.

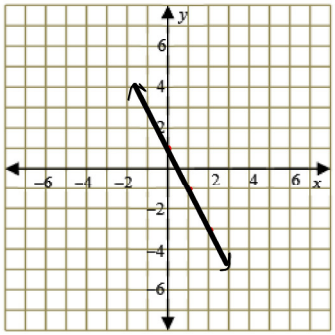
Dependent Systems: These are systems of equations that intersect at all points. They have an infinite number of solutions.

Example:
Solve, graphically.

$\frac{3y}{3} = \frac{-6x}{3} + \frac{3}{3}$ → $y = -2x + 1$

$y = -2x + 1$ same line

sol'n an infinite number of sol'ns along the line $y = -2x + 1$



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.

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#3, 4a, c, e, g
5
6a-f