Notes: Graphing Systems of Equations

Created especially for you by Ms. Whotsoubanh

A system of equations is "more than 1 equation". When graphing a system of linear equations, you are graphing 2 lines to see if they meet, which is called the point of intersection. There are 3 types:

- **Consistent** Equations - if the lines cross once, there will be one solution.
- **Inconsistent** Equations - if the lines are parallel, there will be no solutions.
- **Dependent** Equations - if the lines are the same, there will be an infinite number of solutions.

*If the lines are **parallel**, then the lines have the same slope.

*If the lines are **perpendicular**, then the lines have negative reciprocal slopes.

Steps:

1. Rewrite the equations in slope-intercept form then set up tables for each equation.
2. Use the slope and y-intercept to graph the lines or use the values from the tables to graph the lines.
3. Label the lines.
4. State the point of intersection.
5. Check with the graphing calculator/desmos.com

Example

Solve the following system of equations graphically:

$2x + 3y = 9$

$y + 5 = 2x$

Work:

$2x + 3y = 9$

$-2x \quad -2x$

$\frac{3y}{3} = \frac{-2x}{3} + \frac{9}{3}$

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

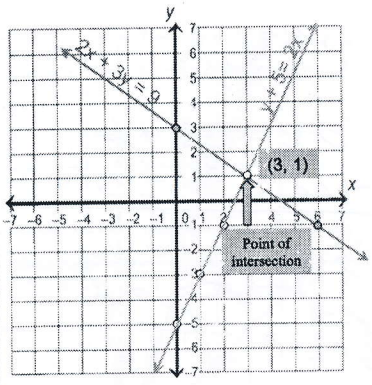
x	y
0	3
3	1
6	-1

$y + 5 = 2x$

$-5 \quad -5$

$y = 2x - 5$

x	y
0	-5
1	-3
3	1



Point of intersection: (3, 1)

Name: Key

Alg. 1 H – Date: Sept. 14

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1.) $3y + 18 = 2x$
$y + x = -1$

line 1

$3y + 18 = 2x$
$-18 \quad -18$

$\frac{3y}{3} = \frac{2x}{3} - \frac{18}{3}$

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

$m = \frac{2}{3} \quad b = -6$

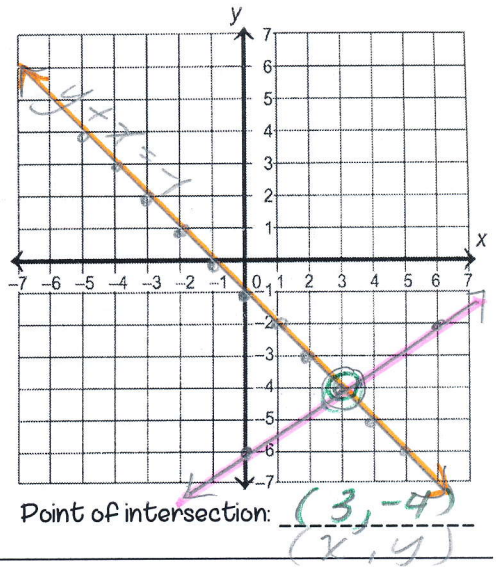
line 2

$y + x = -1$
$-x \quad -x$

$y = -x - 1$

$m = \frac{-1}{1}$

$b = -1$



Point of intersection: $(3, -4)$
(x, y)

2.) $x + 3y = -3$
$3y - 15 = 2x$

$x + 3y = -3$
$-x \quad -x$

$\frac{3y}{3} = \frac{-x}{3} - \frac{3}{3}$

$y = -\frac{1}{3}x - 1$

$m = -\frac{1}{3}$

$b = -1$

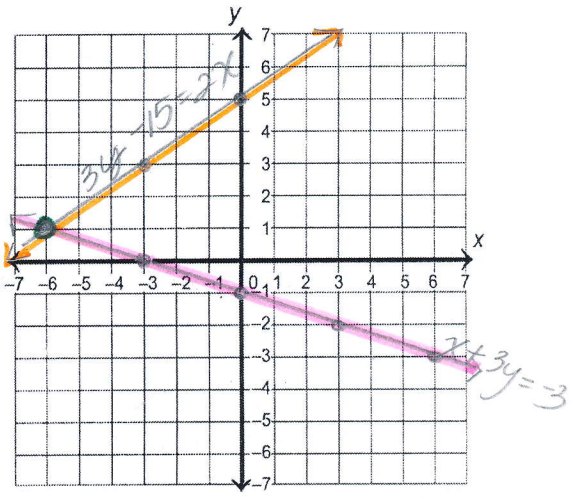
$3y - 15 = 2x$
$+15 \quad +15$

$\frac{3y}{3} = \frac{2x}{3} + \frac{15}{3}$

$y = \frac{2}{3}x + 5$

$m = \frac{2}{3}$

$b = 5$



Point of intersection: $(-6, 1)$
(x, y)

3.) $3x = y + 6$
$x - y = 6$

$3x = y + 6$
$-6 \quad -6$

$3x - 6 = y$

$m = \frac{3}{1}$

$b = -6$

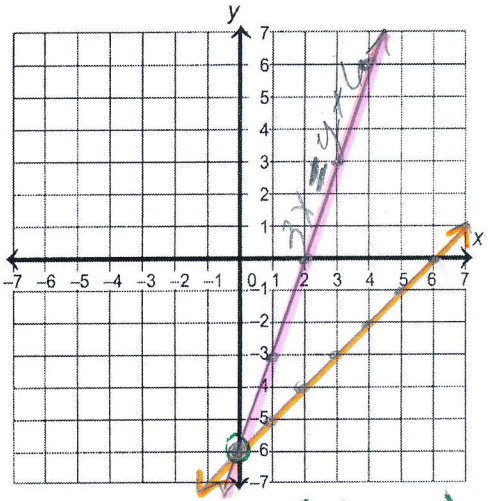
$x - y = 6$
$-x \quad -x$

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

$y = x - 6$

$m = \frac{1}{1}$

$b = -6$



Point of intersection: $(0, -6)$
(x, y)