CRM
SECTION 1B

SLOPES OF LINES

…given two (or more) sets of coordinates

Examples:

1) (-6, 4) & (-1, -6) $\frac{-6-4}{-1-(-6)}=\frac{-10}{5}=-2$

2) (6, -3) & (-0.5, -3) $\frac{-3-(-3)}{-0.5-6}=\frac{0}{-6.5}=0$

3) (10, -4) & (10, 7) $\frac{7-(-4)}{10-10}=\frac{11}{0}=undefined$

$m=\frac{y_2-y_1}{x_2-x_1}$

…given the equation of a line

Find the slope (& y-intercept)

Examples:

1) y = -8x – 17

slope or *m* = -8
y-intercept or *b* = -17

y = mx + b

2) 3y + 5x = 18

Get y by itself: 3y = -5x + 18 m = -5/3
y = -5/3x + 6 b = 6

3) $\frac{1}{2}x=6-5y$

x = 12 – 10y
x – 12 = -10y m = -1/0
y = -1/10x + 6/5 b = 6/5

4) x = -2

cannot get "y" by itself, therefore no slope
-intercept form m = undefined b = none

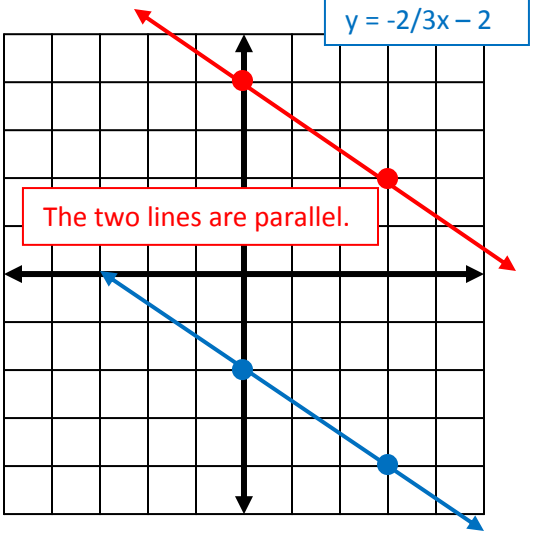
Graph each set of equations, THEN MAKE A "USEFUL" OBSERVATION

Examples:

1) $y=-\frac{2}{3}x+4$

3y + 2x = -6

3y = -2x – 6
y = -2/3x – 2



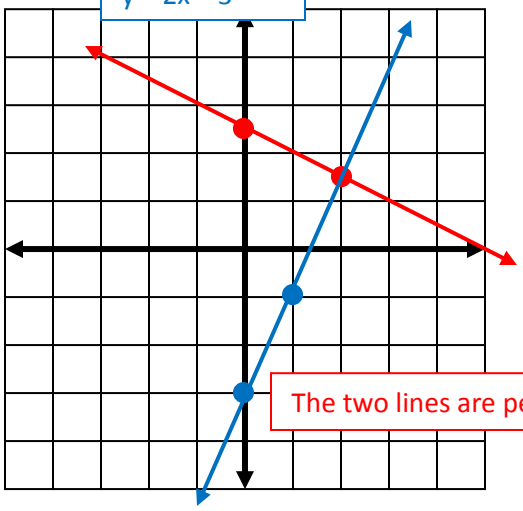
The two lines are parallel.

2) x + 2y = 5

2y = -x + 5
y = -1/2x + 2.5

4y + 12 = 8x

4y = 8x – 12
y = 2x – 3



The two lines are perpendicular.

HOW CAN YOU DETERMINE IF THE EQUATIONS OF TWO LINES WHEN GRAPHED ARE PARALLEL? PERPENDICULAR? OR NEITHER?

Equations of parallel lines have the same slope. Perpendicular lines have negative reciprocal slopes. Otherwise, they are neither.

AND BEYOND……

Slope formula:

$$\frac{-12-4}{-5-(-1)}=\frac{-16}{-4}=4$$

1) Show that the line passing thru the points (-1, 4) & (-5, -12) is perpendicular to the line with equation: 4y + x = -6

4y = -x – 6
y = -1/4x – 3/2

Since the slopes are +4 and -1/4, they are negative reciprocals, and therefore perpendicular.

2) Determine if quadrilateral SLOW is a "rhombus", "square" or "kite"
S(-1, -1); L(9, 4); O(20, 6); W(10, 1)

Slope of SL = $\frac{4-(-1)}{9-(-1)}=\frac{5}{10}=\frac{1}{2}$ Slope of LO = $\frac{6-4}{20-9}=\frac{2}{11}$

Since these two slopes are not perpendicular, SLOW cannot be a square.

Slope of OW = $\frac{1-6}{10-20}=\frac{-5}{-10}=\frac{1}{2}$ Slope of SW = $\frac{1-(-1)}{10-(-1)}=\frac{2}{11}$

A rhombus & parallelogram have opposite slopes parallel, a kite does not. Therefore, SLOW is not a kite. If necessary, use the distance formula to determine if SLOW is a rhombus or a parallelogram.

Homework: