

① SOLVE $8(x-1) < 4(2x+5)$

② What constants does the line
 $-3x - 2y = 15$ pass through?

ACT ③ A function $f(x)$ is defined
LMS
June 09
↓
AS $f(x) = -8x^2$. What is $f(-3)$.

④ $-3|-6+8| = ?$

• EXAM 1 Next Week

$$\textcircled{1} \quad 8(x-1) < 4(2x+5)$$

$$\begin{array}{rcl} 8x - 8 & < & 8x + 20 \\ -8x & & -8x \end{array}$$

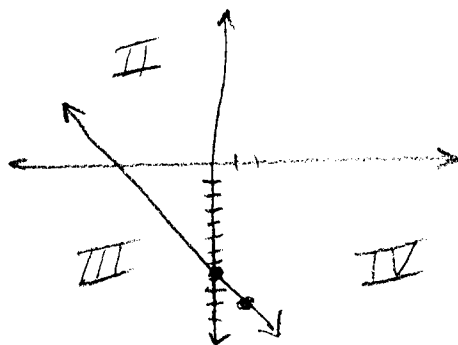
$$-8 < 20 \quad \text{FALSE} \Rightarrow \boxed{\text{NO SOLUTION}}$$

$$\textcircled{2} \quad \begin{array}{rcl} -3x - 2y = 15 \\ +3x & & +3x \end{array}$$

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

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

$$\left(\frac{15}{2} = -7\frac{1}{2} \right)$$



$$\boxed{\text{II, III, IV}}$$

$$\textcircled{3} \quad f(x) = -8x^2$$

$$f(\quad) = -8(\quad)^2$$

$$f(-3) = -8(-3)^2$$

$$= -8(9) = \boxed{-72}$$

$$\textcircled{4} \quad -3 \mid -6 + 8 \mid$$

$$-3 \mid 2 \mid = -3(2) = \boxed{-6}$$

Ch 2-2 $\rightarrow$ 2-4 Linear Equations

How do you know you are dealing with a LE? $\Rightarrow$ Only x, y , Numbers $+, -$

Linear (EX) $\bullet 2x + 3y - x + \frac{1}{2}y = 3 - 9x$

NOT LINEAR (EX) $\bullet 4xy = 6$

$\bullet 2x^2 = y$

$\bullet \frac{4}{x} = y$

Can combine x, y , number terms in thousands of ways $\Rightarrow$ 2 most common forms:

STANDARD FORM $\left\{ \begin{array}{l} \boxed{Ax + By = C} \text{ or } \boxed{Ax + By + C = 0} \\ \boxed{A \geq 0, A, B, C \text{ are integers}} \end{array} \right.$

(EX) $2x + 3y = 9$ or $2x + 3y - 9 = 0$

PUT IN SF $\left\{ -\frac{1}{5}x + 2y = \frac{1}{3} \right.$

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

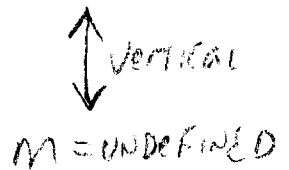
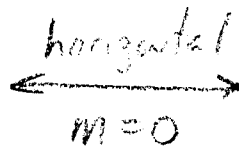
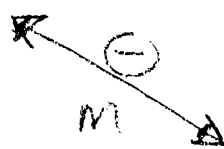
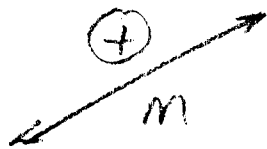
$15 \left(\frac{1}{5}x - 2y \right) = \left(-\frac{1}{3} \right) 15$

$\boxed{3x - 30y = -5}$

Most useful form $\Rightarrow$ "function" form $\Rightarrow y$ by itself

Slope-Intercept Form $\left\{ \begin{array}{l} y = f(x) = mx + b \\ \uparrow \quad \uparrow \\ \text{slope} \quad (0, b) \Rightarrow y\text{-intercept} \end{array} \right.$

How to graph $\left\{ \begin{array}{l} \textcircled{\text{EX}} \quad y = 2x - 6 \\ \textcircled{1} \text{ begin at } b = (0, -6) \\ \textcircled{2} \text{ move by slope} = \frac{\text{Rise}}{\text{Run}} = \frac{2}{1} \end{array} \right.$



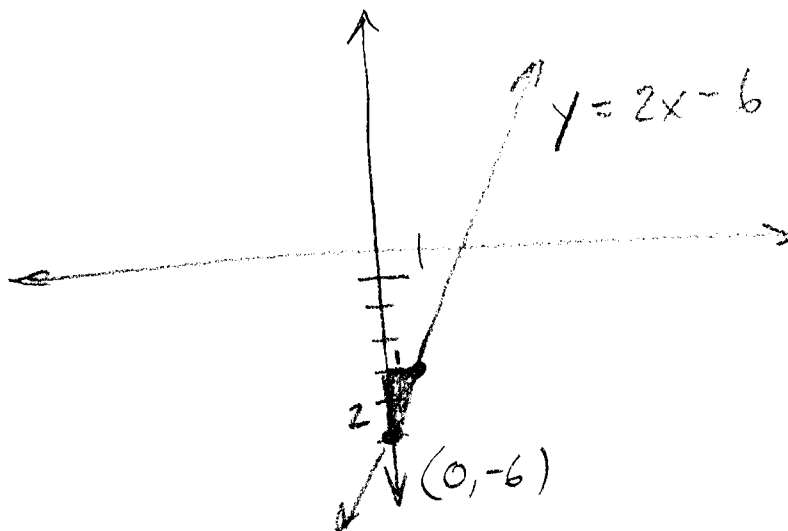
EX

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

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

$$y = 4$$

$$x = 3$$



$$M = \frac{\text{rise}}{\text{run}} = \frac{\text{CHANGE IN } Y \uparrow}{\text{CHANGE IN } X \rightarrow} = \frac{Y_2 - Y_1}{X_2 - X_1}$$

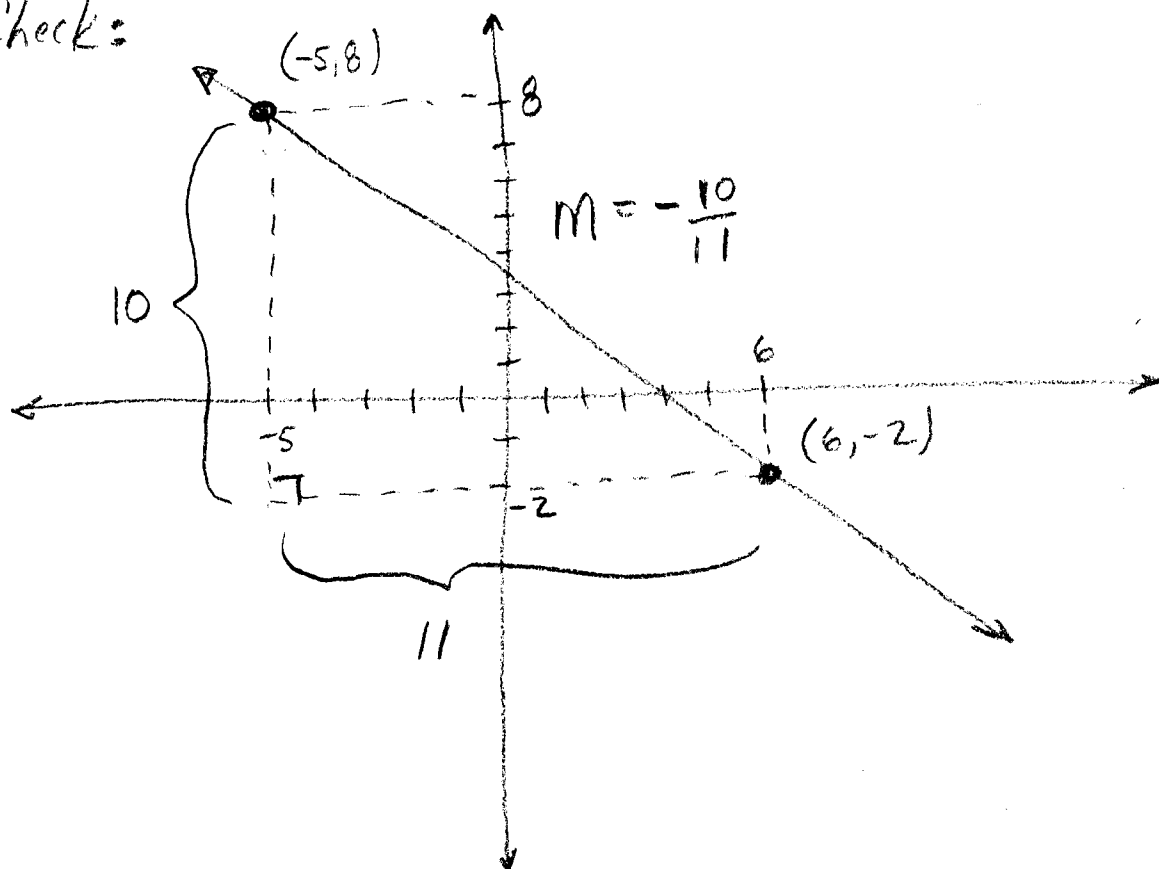
For any 2 points $(x_1, y_1), (x_2, y_2)$

Find slope through $(6, -2), (-5, 8)$
 $(x_1, y_1), (x_2, y_2)$

$$(6, -2), (-5, 8)$$

$$\frac{8 - (-2)}{-5 - 6} = \frac{8 + 2}{-11} = \frac{10}{-11} = \boxed{-\frac{10}{11} = m}$$

Let's
Check:



One of the most typical problems in Algebra $\rightarrow$ Find Equation of Line (EOL) if you know 2 points on line.

EX 2
pg 77 Find EOL through $(-1, 4), (-4, 5)$

Find $m \Rightarrow (-1, 4), (-4, 5) \Rightarrow \frac{5-4}{-4-(-1)} = \frac{1}{-3} = \boxed{-\frac{1}{3} = m}$

$y = \textcircled{m}x + b$

Use known $(x, y), m$ to find $\textcircled{b}$

$4 = \left(-\frac{1}{3}\right)(-1) + b$

Use either $(-1, 4)$ or $(-4, 5)$
 $\Rightarrow$ Use ANY (x, y) on LINE!

$4 = \frac{1}{3} + b$

$-\frac{1}{3} \quad -\frac{1}{3}$

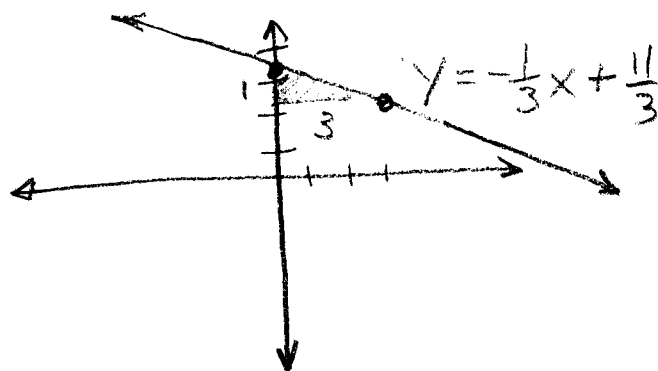
$3\frac{2}{3} = \boxed{\frac{11}{3} = b}$

$y = \textcircled{m}x + \textcircled{b}$

$y = -\frac{1}{3}x + \frac{11}{3}$

" $y = mx + b$ twice METHOD"

Graph:



Finally: Parallel Lines have same slope

$$\begin{array}{l} \textcircled{\text{EX}} \quad y = 2x - 6 \\ \quad \quad y = 2x + 4 \\ \quad \quad y = 2x \end{array} \left. \vphantom{\begin{array}{l} y = 2x - 6 \\ y = 2x + 4 \\ y = 2x \end{array}} \right\} m_{\parallel} = 2 \text{ or } \frac{2}{1}$$

Perpendicular have slopes opposite in sign and are reciprocals.

$$\begin{array}{l} \textcircled{\text{EX}} \quad y = 2x - 6 \\ \quad \quad y = -\frac{1}{2}x + 4 \end{array} \left. \vphantom{\begin{array}{l} y = 2x - 6 \\ y = -\frac{1}{2}x + 4 \end{array}} \right\} \begin{array}{l} m = 2 \\ m_{\perp} = -\frac{1}{2} \end{array}$$

$$\begin{array}{l} \textcircled{\text{EX}} \quad y = -5x \\ \quad \quad y = \frac{1}{5}x + 1 \end{array} \left. \vphantom{\begin{array}{l} y = -5x \\ y = \frac{1}{5}x + 1 \end{array}} \right\} \begin{array}{l} m = -5 \\ m_{\perp} = \frac{1}{5} \end{array}$$

$\textcircled{\text{EX}}$ Find EOL Perpendicular to $y = 2x + 6$ through $(4, 3)$

$$\textcircled{m_{\perp} = -\frac{1}{2}} \quad \begin{array}{c} (4, 3) \\ x, y \end{array} \quad \text{Use } y = mx + b \text{ twice}$$

$$3 = -\frac{1}{2} \cdot 4 + b$$

$$3 = -2 + b$$

$$\therefore \textcircled{b = 5}$$

$$\boxed{y = -\frac{1}{2}x + 5}$$

PERPENDICULAR TO $y = 2x + 6$
AND GOES THROUGH $(4, 3)$

Homework: Pg. 78 #4-10, 19-21
Pg. 79