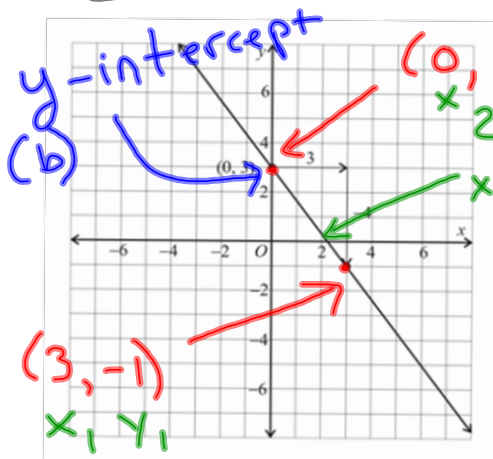


# Straight Lines II



Slope of line =  $m$

(measure of how steep the line is)

Formula to find slope:

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

Where  $(x_1, y_1)$  and

$(x_2, y_2)$  are

any two points on the line.

\* Doesn't matter which point is  $(x_1, y_1)$

and which is  $(x_2, y_2)$ .

$(0, 3)$   $(3, -1)$   
 $x_2, y_2$   $x_1, y_1$

$$m = \frac{y_2 - y_1}{x_2 - x_1} = \frac{3 - (-1)}{0 - 3} = \frac{3 + 1}{-3} = \frac{4}{-3}$$

$$\text{Slope} = m = -\frac{4}{3}$$

$$\text{Slope} = \frac{\text{rise}}{\text{run}} = -\frac{4}{3}$$

## Equation of a line

General form: <sup>Numbers</sup>

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

↑ slope      ↑ y-intercept

For the line above the equation is:

$$\boxed{y = -\frac{4}{3}x + 3}$$

x	y
0	3
$2\frac{1}{4} = \frac{9}{4}$ OR 2.25	0
9	-9

Let  $y=0$ :

$$0 = -\frac{4}{3}x + 3$$

$$\frac{3}{4} \left( \frac{4}{3}x \right) = (3) \frac{3}{4}$$

$$x = \frac{9}{4}$$

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

$$y = \left(-\frac{4}{3}\right)\left(\frac{9}{4}\right) + 3$$

$$y = -\frac{36}{3} + 3$$

$$y = -12 + 3$$

$$y = -9$$

## Stats for 4110 Exam

100 : 4

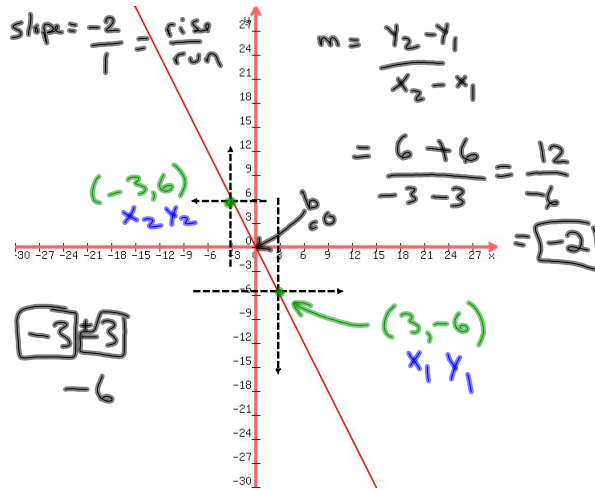
90's : 7

80's : 5

70's : 1

60's : 1

↓ 60 : 4



Egn of this line =

$$y = -2x + 0$$

$$y = -2x$$

→ Passes through origin (0,0)

What if we had labelled the  $x_1, y_1$  &  $x_2, y_2$  the other way around?

$(3, -6)$  and  $(-3, 6)$

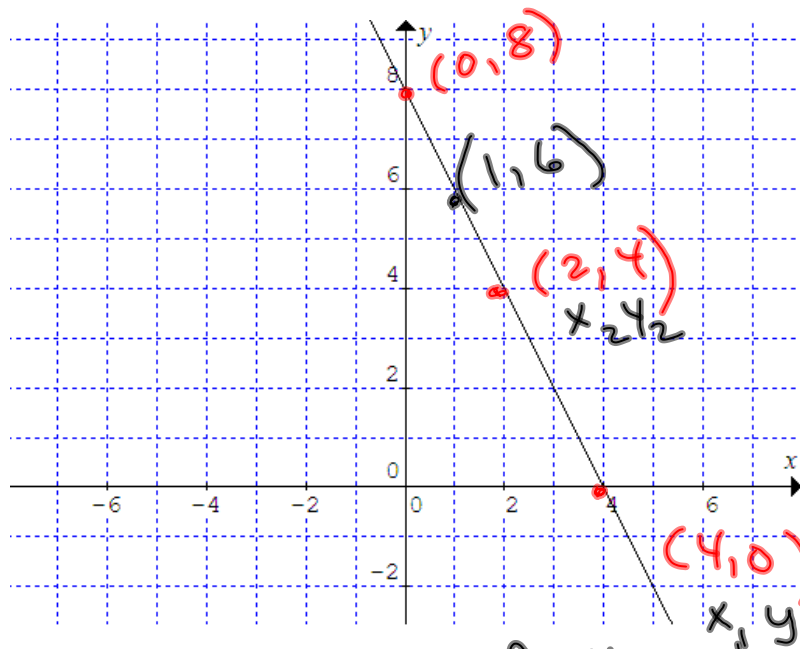
$x_2, y_2$        $x_1, y_1$

~~$(-6, -6)$~~

$$m = \frac{y_2 - y_1}{x_2 - x_1} = \frac{-6 - 6}{3 - (-3)} = \frac{-12}{6} = -2$$

Table of Values for  $y = -2x$ :

x	y
4	-8
-10	20
50	-100



① Find the eqn of this line.

② Find "y" if  $x = 100$ .

$$\textcircled{1} \quad m = \frac{y_2 - y_1}{x_2 - x_1} = \frac{4 - 0}{2 - 4} = \frac{4}{-2} = -2$$

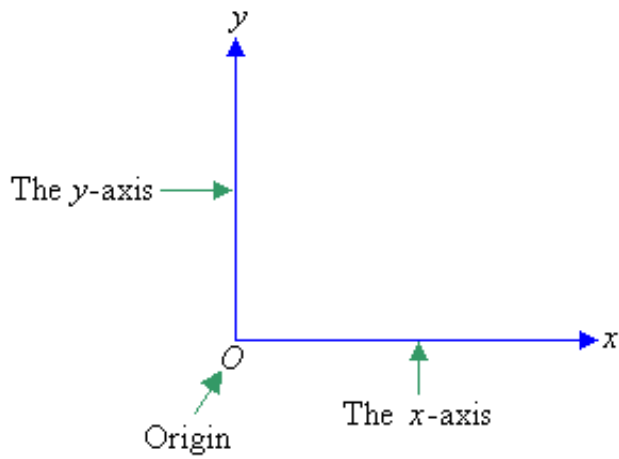
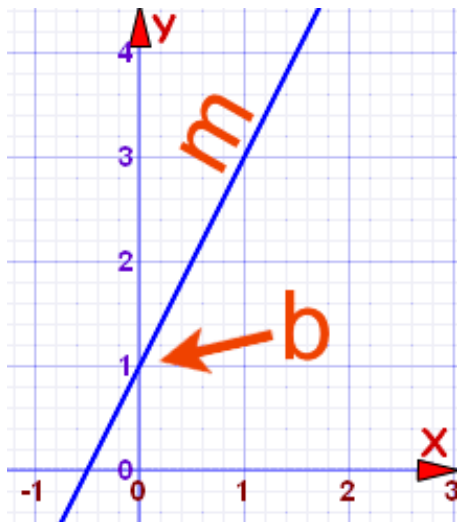
$$\textcircled{1} \text{ Eqn: } \boxed{y = -2x + 8} \quad \frac{6}{4} = \frac{3}{2}$$

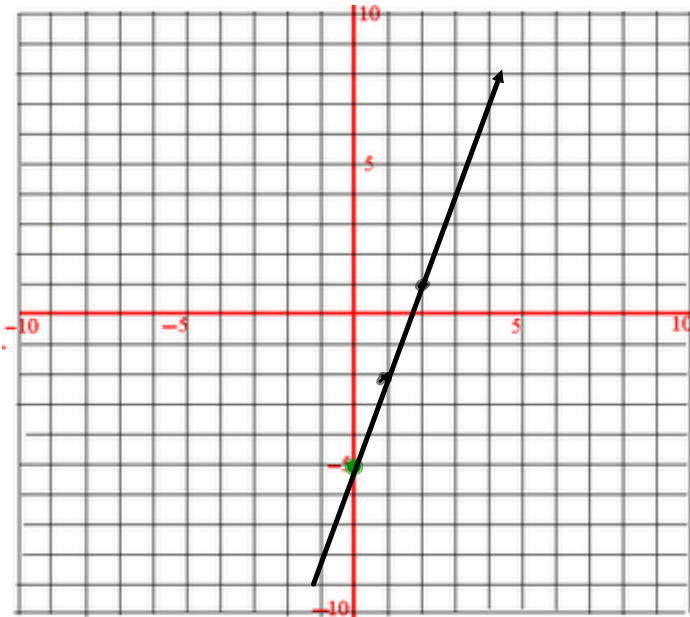
$$\textcircled{2} \quad y = -2(100) + 8$$

$$= -200 + 8$$

$$y = -192$$

Always  
reduce slope





x	y
5	10
-5	-20
2	1
3	4

$$y = mx + b$$

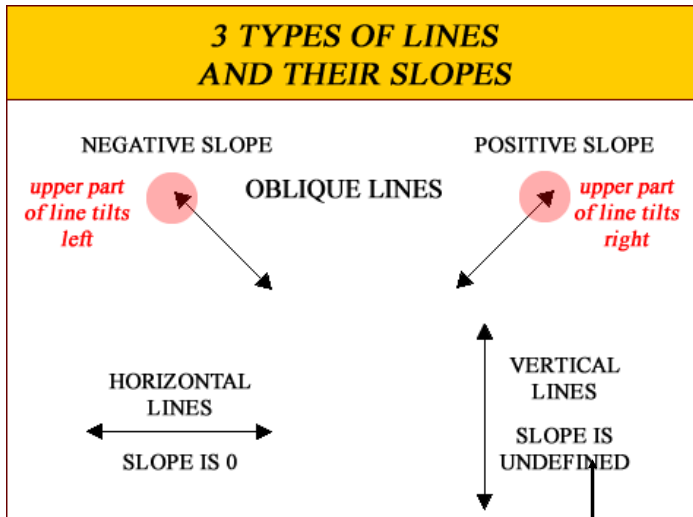
↑
↑  
 slope      y-intercept

$$\text{Slope} = \frac{3}{1} \leftarrow \begin{array}{l} \text{rise} \\ \text{run} \end{array}$$

Graph this  
line.

$$y = 3x - 5$$

↑
↑  
 slope      y-intercept



e.g.)  $(-5, 5)$   $(0, 5)$   $(-5, 5)$   $(0, 5)$

$x_1, y_1$        $x_2, y_2$

$$m = \frac{y_2 - y_1}{x_2 - x_1} = \frac{5 - 5}{0 - (-5)}$$

$$= \frac{0}{5} = 0$$

← For horizontal line  $m = 0$

$(5, 8)$   $(5, 3)$

$x_2, y_2$        $x_1, y_1$

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

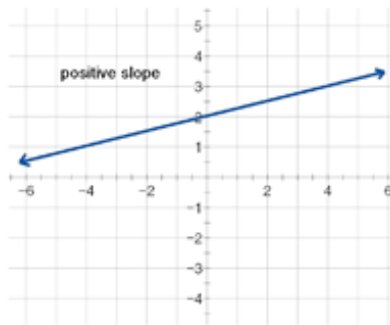
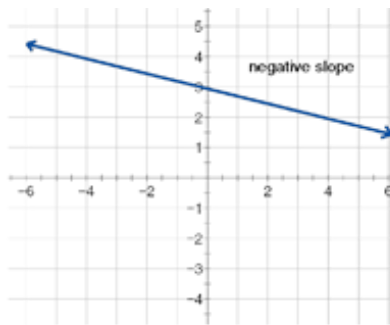
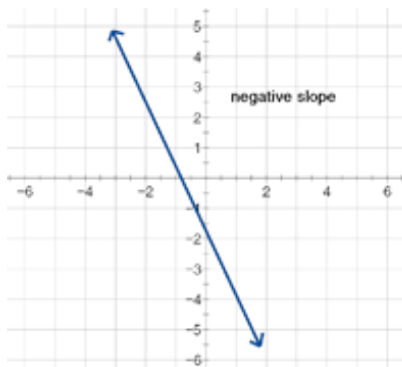
$$= \frac{8 - 3}{5 - 5} = \frac{5}{0}$$

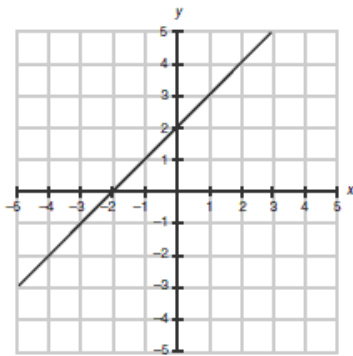
$m = \text{undefined}$  for vertical line

$\frac{0}{5} = 0$

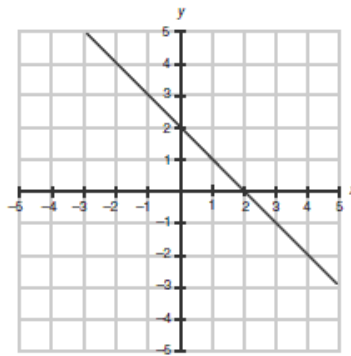
$\frac{5}{0} = \text{undefined}$



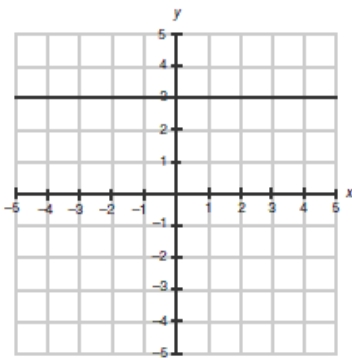




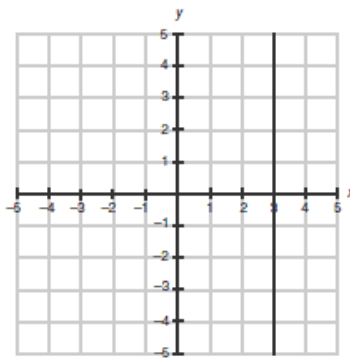
Positive slope



Negative slope



Zero slope



Undefined (no) slope

