

LESSON 8: SLOPE Y-INTERCEPT FORM OF A LINE

1) INVESTIGATE

1. Graph the following lines using a table of values.

① $y = 3x + 4$

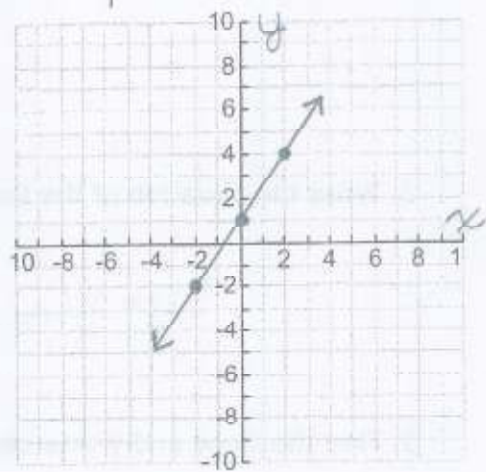
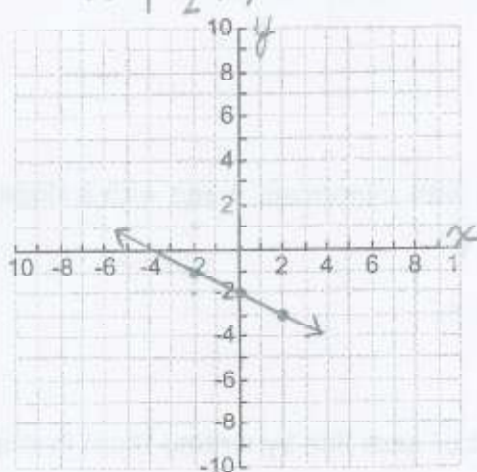
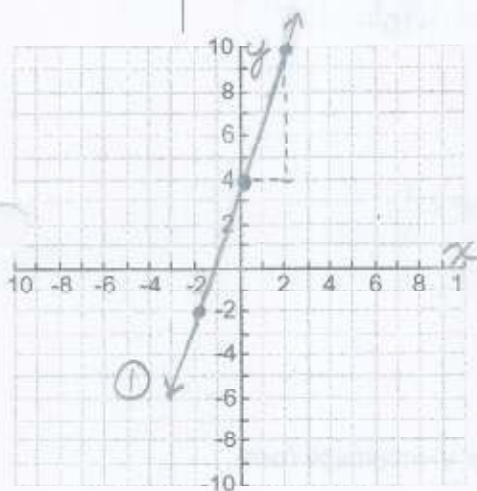
② $y = -\frac{1}{2}x - 2$

③ $y = \frac{3}{2}x + 1$

x	y
-2	$3(-2) + 4 = -2$
0	$3(0) + 4 = 4$
2	10

x	y
-2	$-\frac{1}{2}(-2) - 2 = -1$
0	$-\frac{1}{2}(0) - 2 = -2$
2	$-\frac{1}{2}(2) - 2 = -3$

x	y
-2	$\frac{3}{2}(-2) + 1 = -2$
0	1
2	4



Slope = $\frac{6}{2} = 3$

Slope = $\frac{-1}{2}$

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

y-intercept = 4

y-intercept = -2

y-intercept = 1

What do you notice about the slope and y-intercept of each line? How are they related to the equation of the line that was given?

The **slope y-intercept form** of a line is the equation:

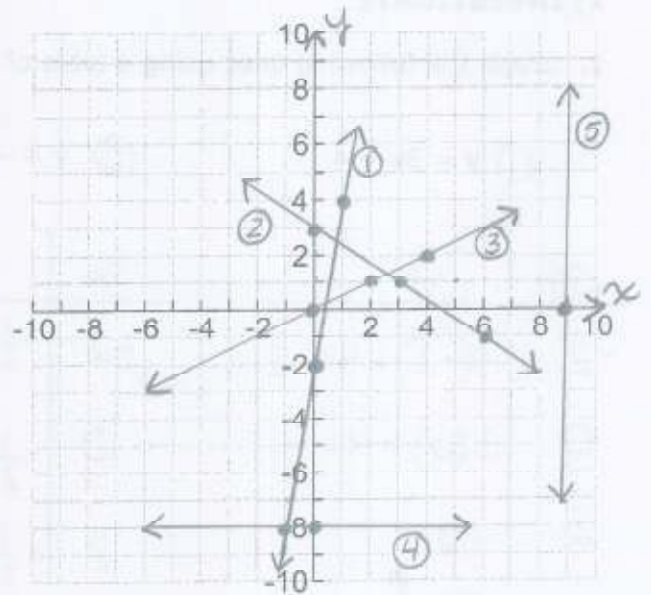
$$y = mx + b$$

↑
↑
 slope y-intercept

2) EXAMPLES

1. Complete the chart and graph each relation using slope and y-intercept.

	Equation	Slope	Y-Intercept
①	$y = 6x - 2$	$6 = \frac{6}{1}$	-2
②	$y = -\frac{2}{3}x + 3$	$-\frac{2}{3}$ or $\frac{2}{-3}$	3
③	$y = \frac{1}{2}x$	$\frac{1}{2}$	0
④	$y = -8$	$0 = \frac{0}{2}$	-8
⑤	$x = 9$	undefined	none



2. Write the equation of the line with y-intercept 4 and with a slope of $-\frac{7}{5}$.

$$y = -\frac{7}{5}x + 4$$

3. Find the slope and y-intercept of each line by writing them in slope y-intercept form.

a) $4x + y = 3$
 $y = -4x + 3$

b) $x - y = 4$
 $\frac{-y}{-1} = \frac{4}{-1} - \frac{x}{-1}$
 $y = x - 4$

c) $x - 2y - 4 = 0$
 $-2y = -x + 4$
 $y = \frac{1}{2}x - 2$

d) $5x + 2y = 10$
 $2y = 5x - 10$

slope = $\frac{1}{2}$ y-intercept = -2

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Slope

Recall that the equation $y = mx + b$ represents a straight line with slope $m = y$ intercept b . Also to find slope you find the rise (change in y coordinates) and divide by the run (change in x coordinates)

$$\text{slope} = \frac{y_2 - y_1}{x_2 - x_1} = \frac{\text{rise}}{\text{run}} = \frac{\Delta y}{\Delta x}$$

Ex 1: $m = \frac{9-2}{8-1} = \frac{7}{7} = 1$

Ex 2: points $C(1, 1)$ $D(-4, 9)$

$$\text{slope} = \frac{9-1}{-4-1} = \frac{8}{-5}$$

Sketch each using slope and y-intercept

make slope a fraction

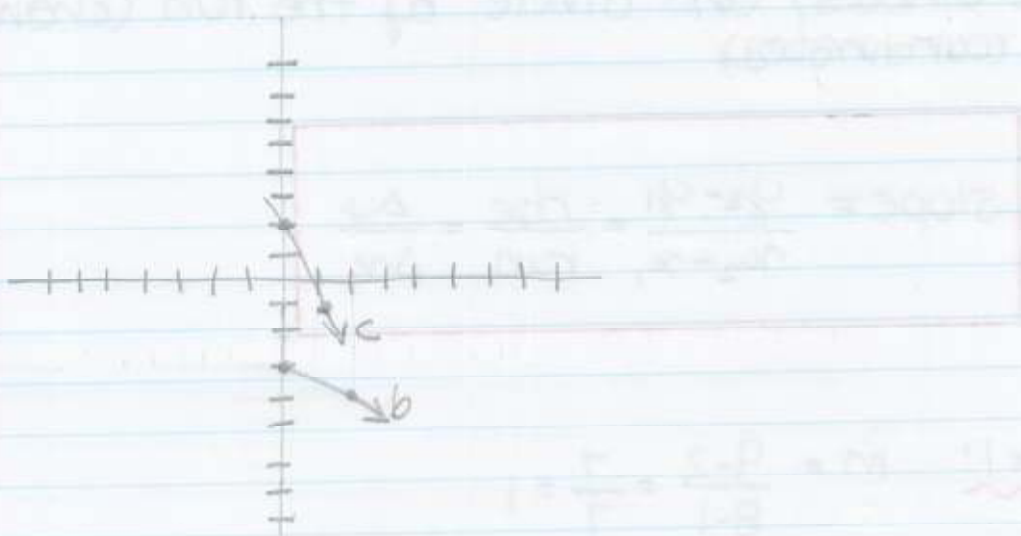
a. $y = 2x - 2$

$\frac{2}{1}$

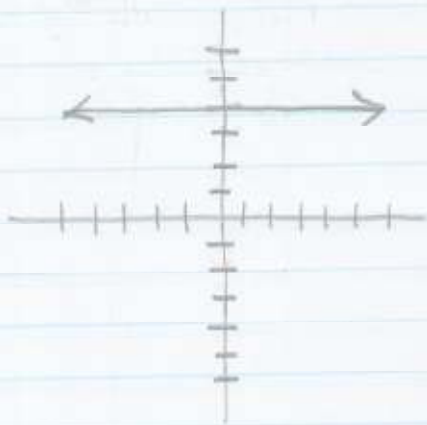
b. $y = -\frac{1}{2}x - 3$

c. $y = -3x + 2$

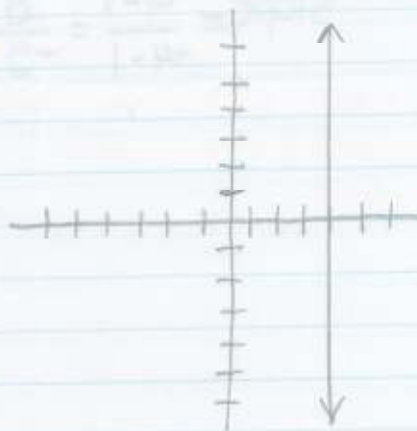
$-\frac{3}{1}$



$y = 4$



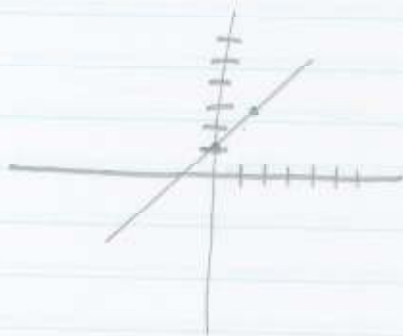
$x = 4$



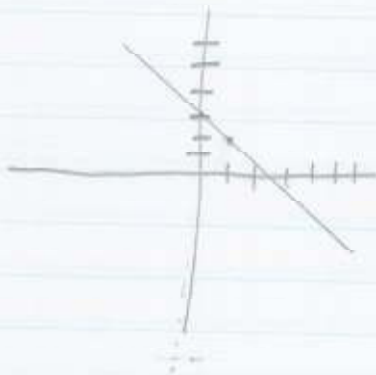
Give the equations

1st → get y-int.

2nd → get slope



$$y = \frac{2}{1}x + 1$$
$$y = 2x + 1$$



$$y = -1x + 3$$

Sketch

$$2x + 3y + 1 = 0$$

$$3y = -2x - 1$$

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

