

Alg. I

Review: Finding Slope and Equations of Lines

Slope (m): $\frac{\text{vertical change}}{\text{horizontal change}}$ or "rise" / "run"

Slope Formula:

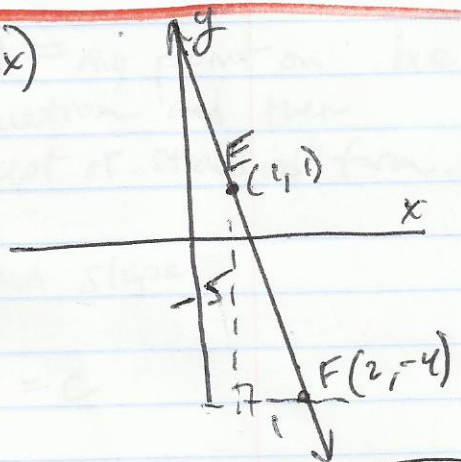
$$m = \frac{y_2 - y_1}{x_2 - x_1}, \text{ given points } (x_1, y_1) (x_2, y_2)$$

Ex) Find the slope of the line AB if A(2,5) and B(-2,3)

$\begin{matrix} x_1 & y_1 & & x_2 & y_2 \end{matrix}$

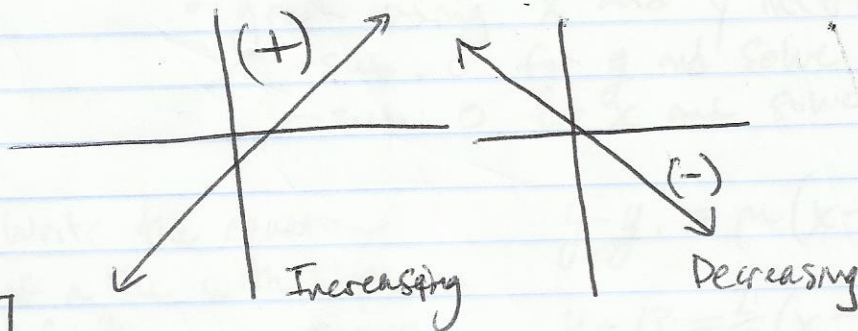
$$m = \frac{3 - 5}{-2 - 2} = \frac{-2}{-4} = \boxed{\frac{1}{2}}$$

Ex)



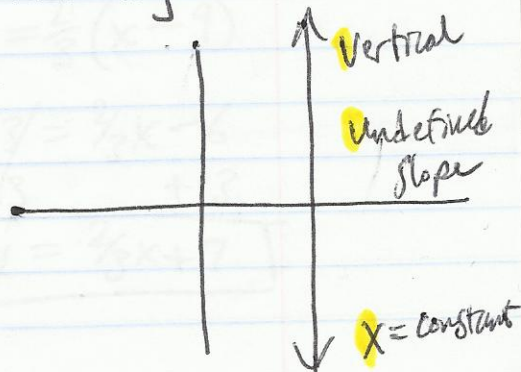
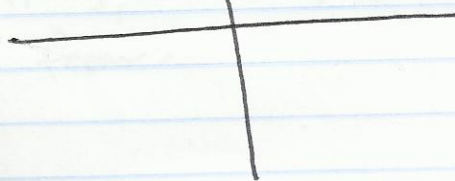
$$m = \frac{-5}{1} = \boxed{-5}$$

Slope Characteristics:



H	V
0	u
v	x

Horizontal 0-slope $\rightarrow y = \text{constant}$



Equations of Lines:

Slope-Intercept Form ($y = mx + b$)

- change to this form to find slope.
- $m = \text{slope}$; $b = y\text{-intercept}$
- graph using $y\text{-intercept}$ as starting point and plot more points using slope.

Point-Slope Form $y - y_1 = m(x - x_1)$

- $m = \text{slope}$; $(x_1, y_1) = \text{any point on line}$.
↳ can use to write equation and then change to slope-intercept or standard form.

- graph using (x_1, y_1) and slope.

Standard Form $ax + by = c$

- a and b are coefficients of x and y and c is a constant; no fractions.

- graph using x and y intercepts
- sub. 0 for y and solve for x ($x\text{-int.}$)
- sub. 0 for x and solve for y ($y\text{-int.}$)

Ex) Write the equation of a line with slope of $\frac{2}{3}$, passing through

$(9, 13)$, in slope intercept form.

$$y - y_1 = m(x - x_1)$$

$$y - 13 = \frac{2}{3}(x - 9)$$

$$y - 13 = \frac{2}{3}x - 6$$

$$\begin{array}{r} +13 \qquad +13 \\ \hline y = \frac{2}{3}x + 7 \end{array}$$

Ex) Write the equation of the line through
 $(-2, 2)$ and $(0, 8)$

$$m = \frac{y_2 - y_1}{x_2 - x_1} = \frac{8 - 2}{0 - (-2)} = \frac{6}{2} = 3$$

$$y - y_1 = m(x - x_1)$$

$$y - 8 = 3(x - 0)$$

$$y - 8 = 3x$$

$$y = 3x + 8 \quad \text{or} \quad 3x - y = -8$$

(Slope-intercept) (standard)

Ex) A line contains $(-4, y)$ and $(2, 4y)$, with a slope of 6.

Find y :

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

$$6 = \frac{4y - y}{2 - (-4)} = \frac{3y}{6}$$

$$(6) \quad 6 = \frac{3y}{6} (6)$$

$$3y = 36$$
$$\boxed{y = 12}$$

Hw: Writing Equations
WS