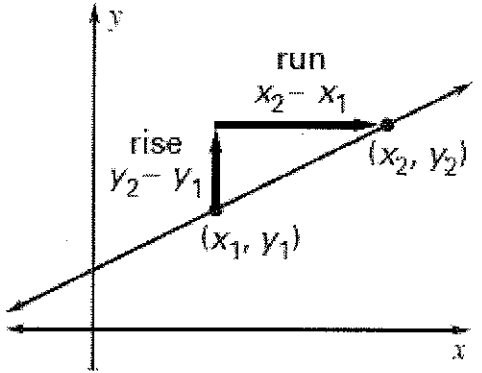


4.4 -4.5 Review: Slope & Slope-Intercept Equations

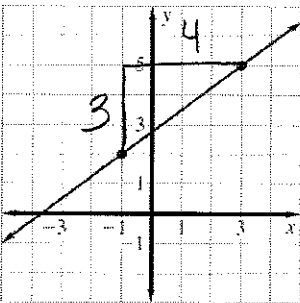
p.239: 9-15 odd,
p.247: 12, 14, 16, 22, 24, 26

Finding the slope of a line:

| Words | Symbols | Graph |
|---|---|--|
| <p>The slope, m, of a nonvertical line passing through the two points (x_1, y_1) and (x_2, y_2) is the ratio of the <u>rise</u> (change in y) to the <u>run</u> (change in x).</p> $\text{slope} = \frac{\text{rise}}{\text{run}} = \frac{\text{change in } y}{\text{change in } x}$ | $m = \frac{y_2 - y_1}{x_2 - x_1}$ <p>OR</p> $m = \frac{y_1 - y_2}{x_1 - x_2}$ |  |

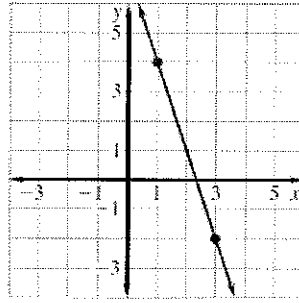
Examples

Find the slope of each line graphed or described below.

1.) 

$$\begin{matrix} (-1, 2) & (3, 5) \\ x_1, y_1 & x_2, y_2 \end{matrix}$$

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

2.) 

$$\begin{matrix} (1, 4) & (3, -2) \\ y_1, x_1 & x_2, y_2 \end{matrix}$$

$$m = \frac{-2-4}{3-1} = \frac{-6}{2} = -3$$

3.) The line that passes through $(5, 2)$ and $(5, -2)$.

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

$$m = \frac{-2-2}{5-5} = \frac{-4}{0}$$

undefined

4.) The line that passes through $(0, 4)$ and $(-3, 4)$.

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

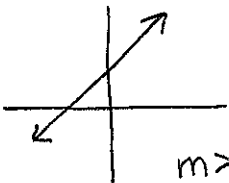
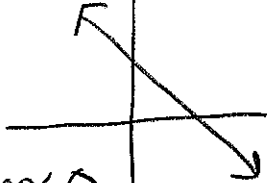
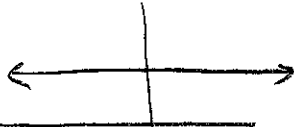
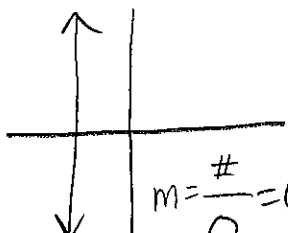
$$m = \frac{4-4}{-3-0} = \frac{0}{-3} = 0$$

5.) The line that passes through $(0, 6)$ and $(5, -4)$.

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

$$m = \frac{-4-6}{5-0} = \frac{-10}{5} = -2$$

Summary – Classification of lines by slope (sketch each type of line below)

| | | | |
|--|--|--|--|
| <p>A line with positive slope <u>rises</u> from left to right</p>  <p>$m > 0$</p> | <p>A line with negative slope <u>falls</u> from left to right</p>  <p>$m < 0$</p> | <p>A line with zero slope is <u>horizontal</u></p>  <p>$m = \frac{0}{\#} = 0$</p> | <p>A line with undefined slope is <u>vertical</u></p>  <p>$m = \frac{\#}{0} = \text{undef.}$</p> |
|--|--|--|--|

Slope-Intercept form of a line

Words

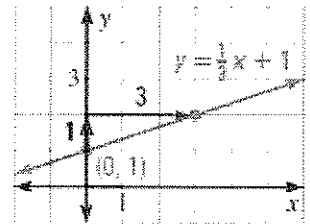
A linear equation of the form $y = mx + b$ where m is the Slope and b is the y-int.

Symbols

$$y = mx + b$$

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

Graph



To graph a line using slope and y-intercept, follow these 4 steps:

Step 1: Rewrite the equation in **slope-intercept form** (solve the equation for y)

Step 2: Identify the **slope** and **y-intercept**

Step 3: Plot the point that corresponds to the **y-intercept**

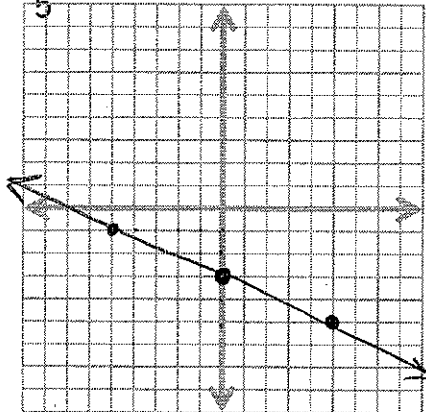
Step 4: Use the **slope** (rise over run) to locate a second point, and draw the line

EXAMPLES

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

$$b = -3$$

$$m = -\frac{2}{5}$$



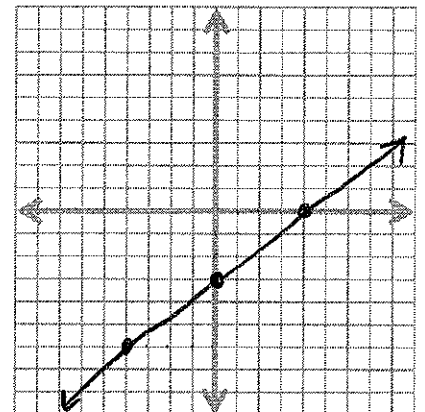
2.) Graph $3x - 4y = 12$

$$\frac{-4y}{-4} = \frac{-3x + 12}{-4}$$

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

$$b = -3$$

$$m = \frac{3}{4}$$



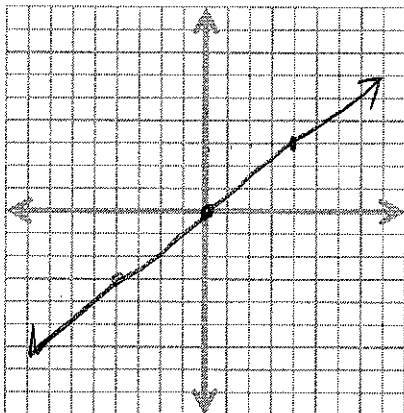
3.) Graph $3x - 4y = 0$

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

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

$$b = 0$$

$$m = \frac{3}{4}$$



4.) Graph $-2y + 5x = 10$

$$\frac{-2y}{-2} = \frac{-5x + 10}{-2}$$

$$y = \frac{5}{2}x - 5$$

