

From RR 19

Note Title

2/5/2015

a) $x - 2y = 12$

Find the x-intercept:

$$\begin{aligned} \text{Set } y=0 & \quad x - 2(0) = 12 \\ & \quad x - 0 = 12 \\ & \quad x = 12 \end{aligned}$$

$(12, 0)$

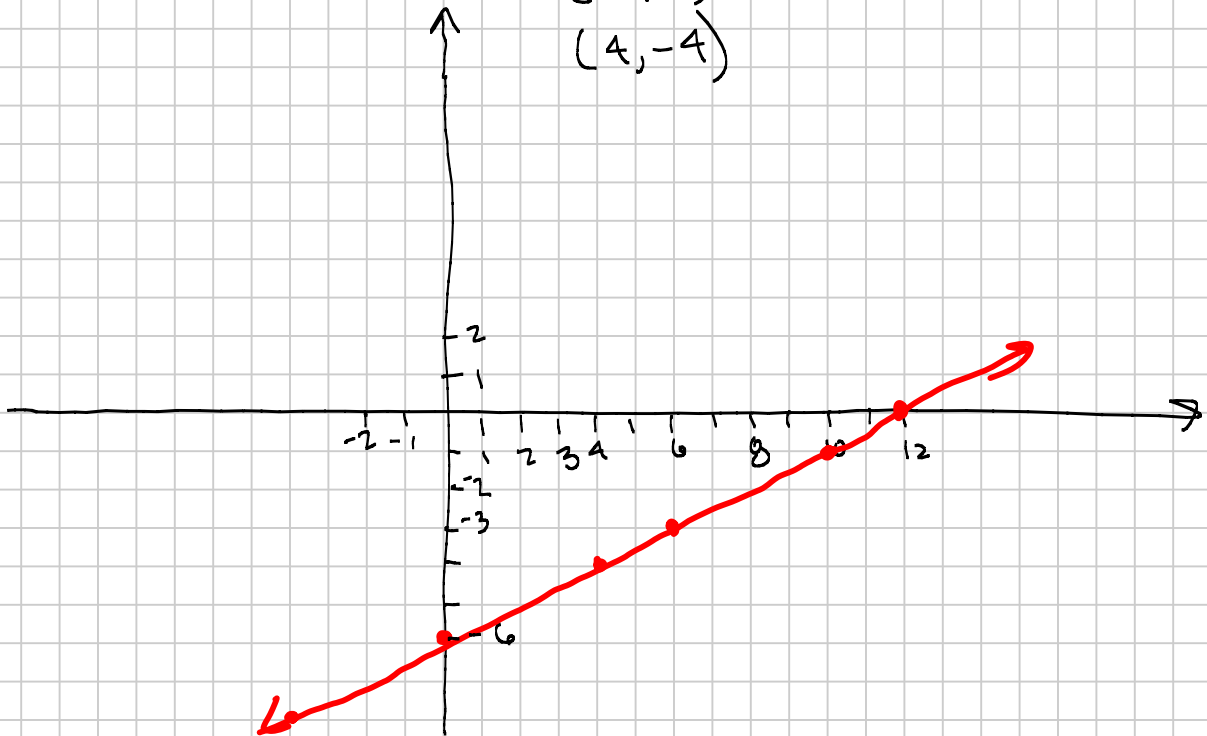
Find y-intercept:

$$\text{Set } x=0$$

$$\begin{aligned} x - 2y &= 12 \\ 0 - 2y &= 12 \\ -2y &= 12 \\ \frac{-2y}{-2} &= \frac{12}{-2} \\ y &= -6 \\ (0, -6) \end{aligned}$$

Other ordered pairs: $(6, -3)$
 $(10, -1)$
 $(4, -4)$

x	y
12	0
0	-6
6	-3
10	-1
4	-4
-4	-8



b) Find the intercepts for $2y = -3x$. Graph it.

Find x-intercept:

Set $y=0$

$$2y = -3x$$

$$2(0) = -3x$$

$$0 = -3x$$

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

$$0 = x$$

$$(0, 0)$$

Find y-intercept:

Set $x=0$

$$2y = -3x$$

$$2y = -3(0)$$

$$2y = 0$$

$$\frac{2y}{2} = \frac{0}{2}$$

$$y = 0$$

$$(0, 0)$$

Need to find another point:

$$2y = -3x$$

$y=6$

$$2(6) = -3x$$

$$12 = -3x$$

$$\frac{12}{-3} = \frac{-3x}{-3}$$

$$-4 = x$$

$$(-4, 6)$$

$y=-6$

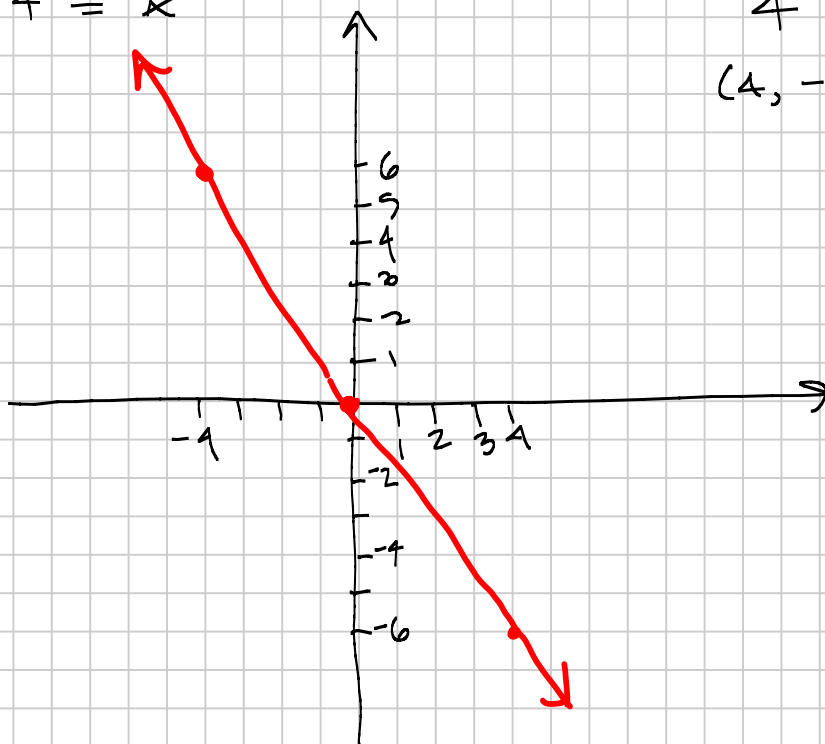
$$2(-6) = -3x$$

$$-12 = -3x$$

$$\frac{-12}{-3} = \frac{-3x}{-3}$$

$$4 = x$$

$$(4, -6)$$



Homework Qs

3.2 #55) $2x + 8 = y$

Find x-int: Set $y=0$ | $2x + 8 = 0$
 $2x = -8$
 $x = -4$
 $(-4, 0)$

Find y-intercept: set $x=0$

$$2(0) + 8 = y$$
$$8 = y$$
$$(0, 8)$$

53) $y = -\frac{3}{4}x + 2$

Find x-intercept: Set $y=0$ |
 $0 = -\frac{3}{4}x + 2$
 $-2 = -\frac{3}{4}x$

multiply both
sides by 4:

$$-2(4) = -\frac{3}{4}x(4)$$
$$-8 = -3x$$
$$\frac{-8}{-3} = \frac{-3x}{-3}$$
$$\frac{8}{3} = x$$
$$x = 2\frac{2}{3}$$

$$(2\frac{2}{3}, 0)$$

Find y-intercept: set $x=0$:

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

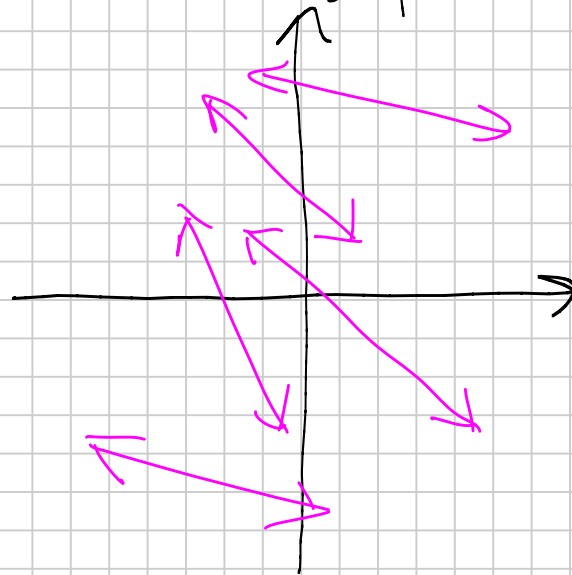
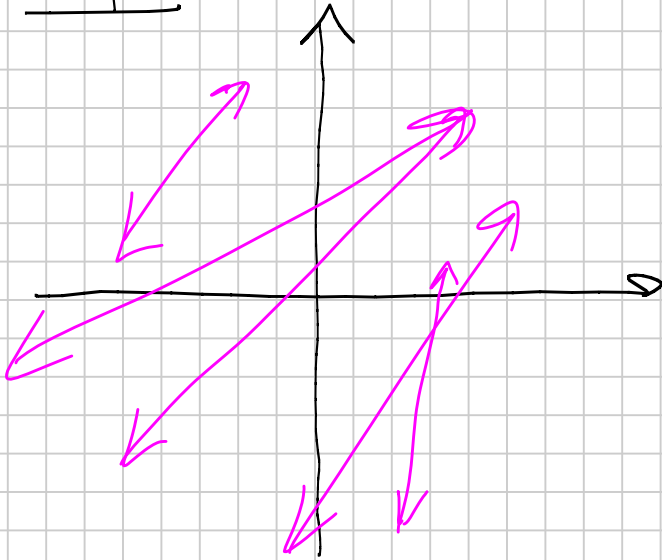
Find another point:

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

$x = -8$ |
 $y = -\frac{3}{4}(-8) + 2$
 $y = \frac{24}{4} + 2$
 $y = 6 + 2 = 8$ $(-8, 8)$

3.3: Slope of a Line

Slope: measures the direction and steepness of a line.

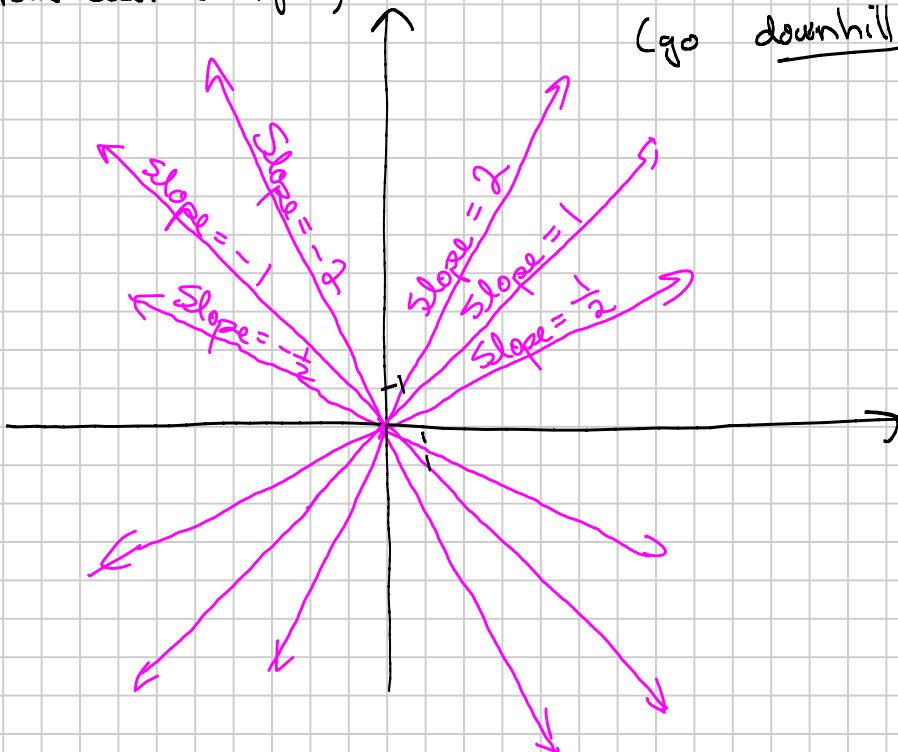


Positive Slopes

(go uphill from left to right)

Negative Slopes

(go downhill from left to right)



For positive slopes, larger slope $\Rightarrow$ closer to vertical (steeper)

For negative slopes, note that $-2 < -1$. Slope of -2 is closer to vertical (steeper) than a slope of -1 .

Definition: The slope of a line is

$$m = \frac{y_2 - y_1}{x_2 - x_1}, \text{ where } (x_1, y_1) \text{ and } (x_2, y_2) \text{ are points on the line.}$$

$$\text{Slope} = \frac{\text{vertical change}}{\text{horizontal change}} = \text{" Rise " \over " Run "}$$

Example: Graph the line that passes through the point $(1, -3)$ and has slope $\frac{2}{3}$.

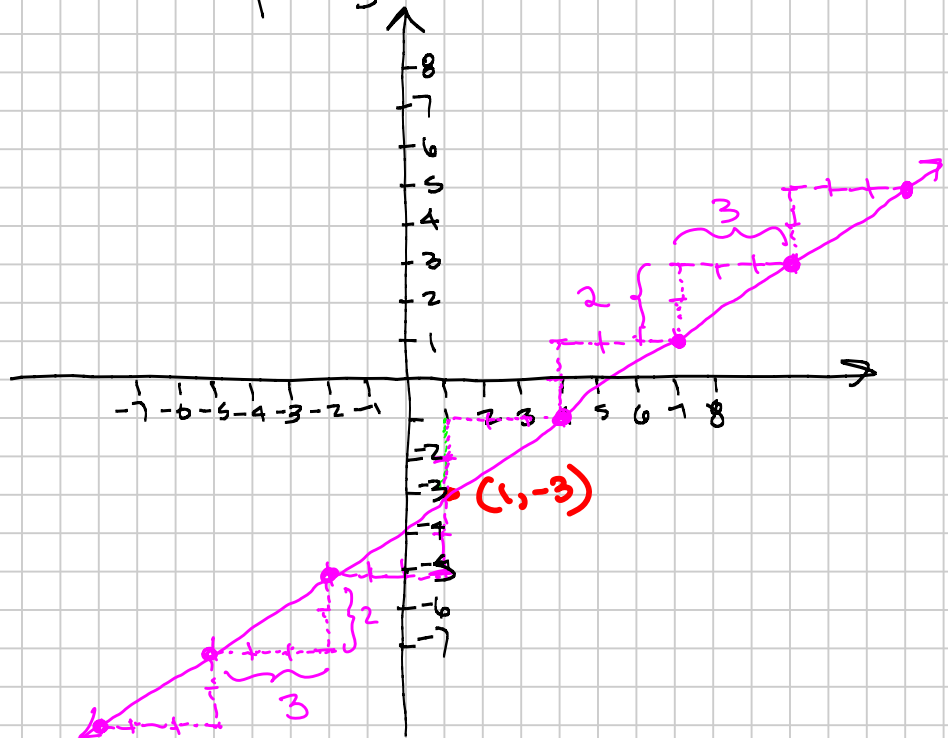
$$\text{Slope: } m = +\frac{2}{3}$$



$$\frac{\text{Rise}}{\text{Run}} = +\frac{2}{3}$$

$$\text{Rise} = \text{vertical change} = 2$$

$$\text{Run} = \text{horizontal change} = 3$$



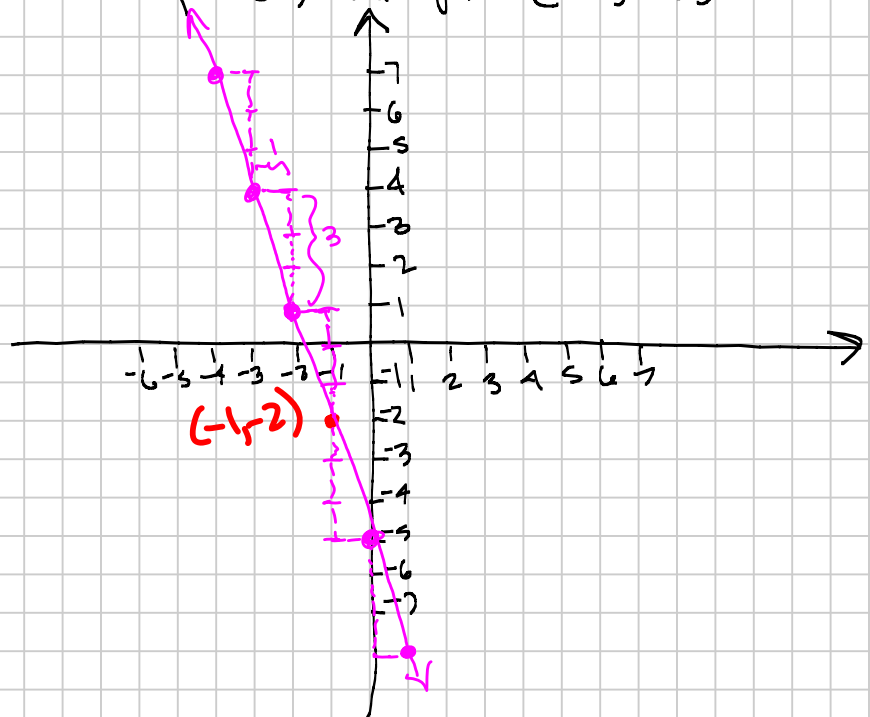
Example: Graph the line that passes through $(-1, -2)$ and has slope -3 .

$$\text{Slope: } m = -3 = -\frac{3}{1}$$



$$\text{Rise} = \text{vertical change} = 3$$

$$\text{Run} = \text{horizontal change} = 1$$



Calculating the slope given two points:

3.3.3

Def'n: Slope is $m = \frac{y_2 - y_1}{x_2 - x_1}$, where (x_1, y_1) and (x_2, y_2) are points on the line.

Example: Find the slope of the line containing the points $(-3, 2)$ and $(5, 8)$.

Let $(x_1, y_1) = (-3, 2)$

$(x_2, y_2) = (5, 8)$

$$m = \frac{y_2 - y_1}{x_2 - x_1} = \frac{8 - 2}{5 - (-3)} = \frac{6}{5 + 3} = \frac{6}{8} = \frac{3}{4}$$

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

Ex: Find the slope of the line containing the points $(4, -6)$ and $(-1, -3)$.

$$m = \frac{y_2 - y_1}{x_2 - x_1} = \frac{-3 - (-6)}{-1 - 4} = \frac{-3 + 6}{-5} = \frac{3}{-5} = -\frac{3}{5}$$

Slope: $m = -\frac{3}{5}$

OR, use the other order:

$(4, -6)$
 $x_2 \ y_2$

$(-1, -3)$
 $x_1 \ y_1$

$$m = \frac{y_2 - y_1}{x_2 - x_1} = \frac{-6 - (-3)}{4 - (-1)} = \frac{-6 + 3}{4 + 1} = \frac{-3}{5} = \boxed{-\frac{3}{5}}$$

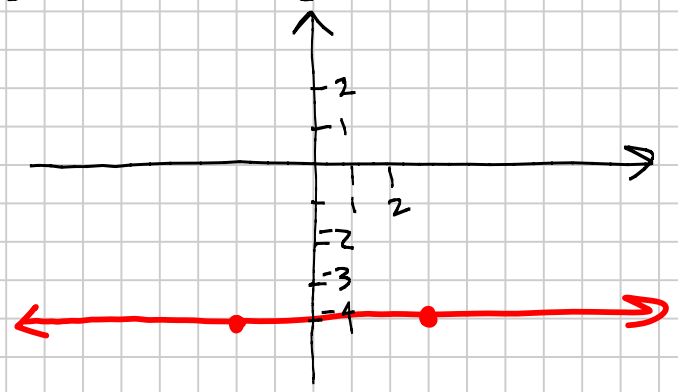
(same answer)

Ex: Find the slope of the line containing the points $(3, -4)$ and $(-2, -4)$.

$$m = \frac{y_2 - y_1}{x_2 - x_1} = \frac{-4 - (-4)}{-2 - 3} = \frac{-4 + 4}{-5} = \frac{0}{-5} = 0$$

Slope: $m=0$

All horizontal lines have slope 0.



Ex: Find the slope of the line containing the points $(5, 1)$ and $(5, 3)$.

$$m = \frac{y_2 - y_1}{x_2 - x_1} = \frac{3 - 1}{5 - 5} = \frac{2}{0}$$

undefined - cannot divide by 0

The slope is undefined.

Important:

Every vertical line has undefined slope
Every horizontal line has 0 slope.

