

Warmup

□ 1.) $y = 2x + 3$

Find the intercepts

<u>x-int</u>	<u>y-int</u>
$0 = 2x + 3$	$y = 2(0) + 3$
$-3 = 2x$	$y = 3$
$-\frac{3}{2} = x$	$(0, 3)$
$(-\frac{3}{2}, 0)$	

□ 2.) $x^2 - 4y = 10$

□ Find the symmetry

x-axis Yes
 $x^2 - 4(-y) = 10$ $(-x)^2 - 4y = 10$
 $x^2 + 4y = 10$ $x^2 - 4y = 10$

origin No
 $(-x)^2 - 4(-y) = 10$
 $x^2 + 4y = 10$

LINEAR EQUATIONS

Chapter 1

Section 3

Linear equation

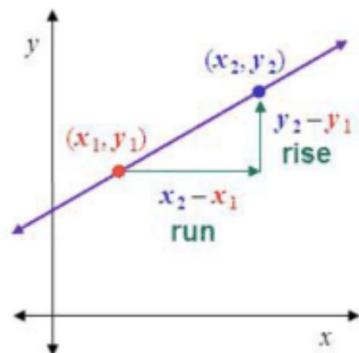
- An equation on the form: $y = mx + b$
 - Where m = slope and b = y -intercept $(0, b)$
- The graph of a linear equation is a straight line

Slope

- Slope: rate of change of a line
 - The steepness of a line

$$m = \frac{\text{rise}}{\text{run}} \quad m = \frac{\text{change in } y}{\text{change in } x} \quad m = \frac{y_2 - y_1}{x_2 - x_1}$$

- Where $m = \text{slope}$



Finding Slope

□ Find Slope Using Two Points:

$$1. \ (2,3) \ (5,4)$$

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

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

$$m = \frac{1}{3}$$

$$2. \ (5,-1) \ (-3,6)$$

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

$$m = \frac{6 - (-1)}{-3 - 5}$$

$$m = \frac{7}{-8}$$

Find the Slope of the Following:

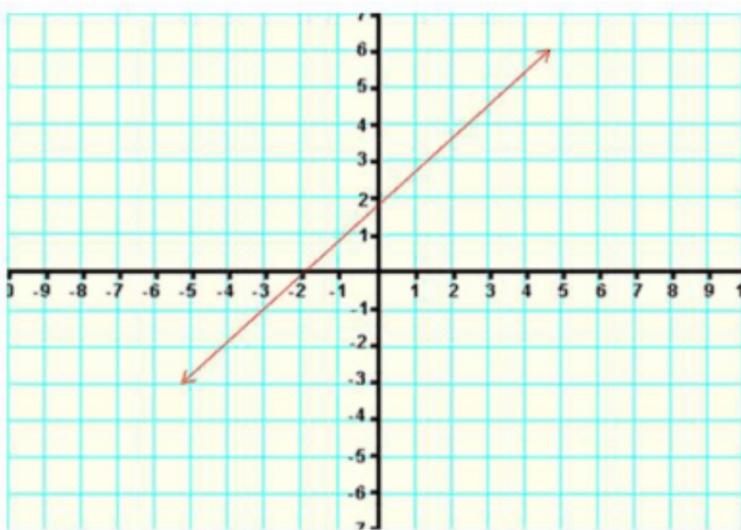
- 3. (-1,2) and (-3,4)
- 4. (0,0) and (9,10)

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

$$m = \frac{10-0}{9-0} = \frac{10}{9}$$

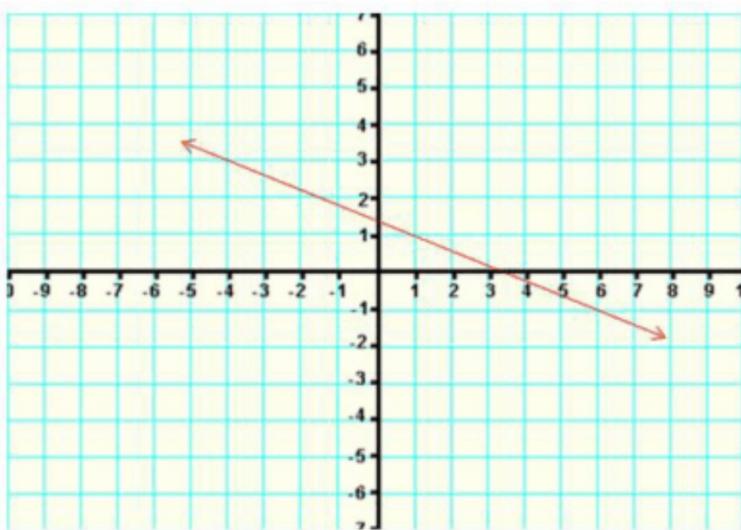
Positive Slope

- A line that rises from left to right is a positive slope.
- When finding the m value, the m will always be positive if the line is a positive slope



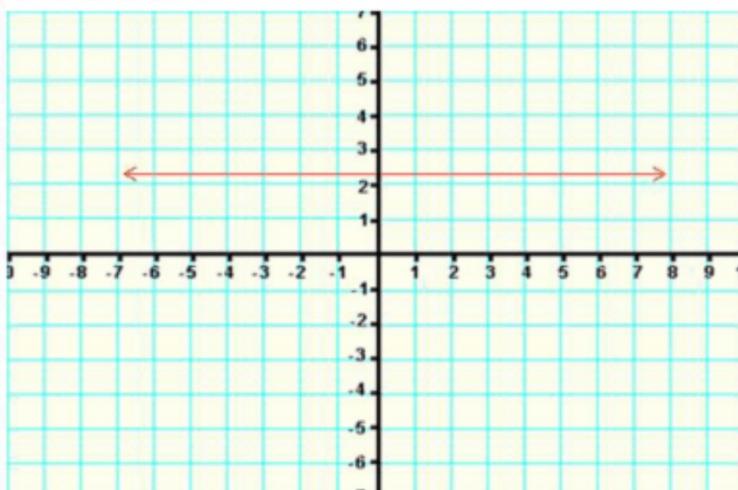
Negative Slope

- A line that with a negative slope falls from left to right.
- The slope value of the line will always be negative.



Zero Slope

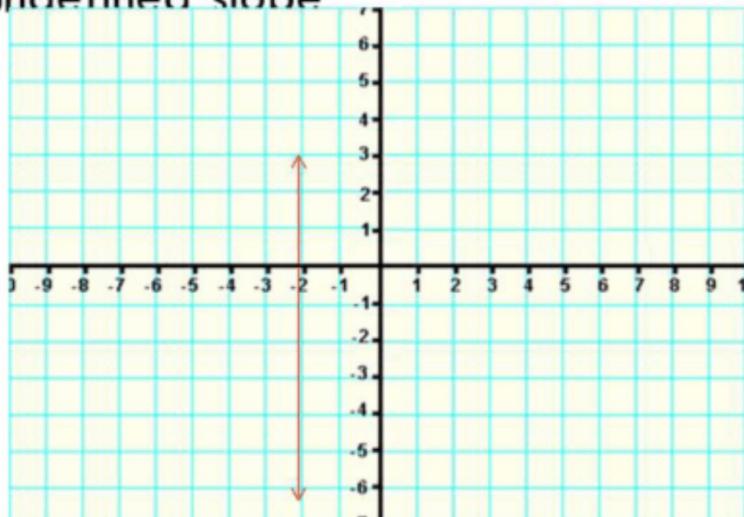
- A line with zero slope is a horizontal line.
- The m value will come out to be 0 over a number, which means the slope is zero. $\frac{0}{5} = 0$
- An equation that is $y =$ a number, the slope will always be zero



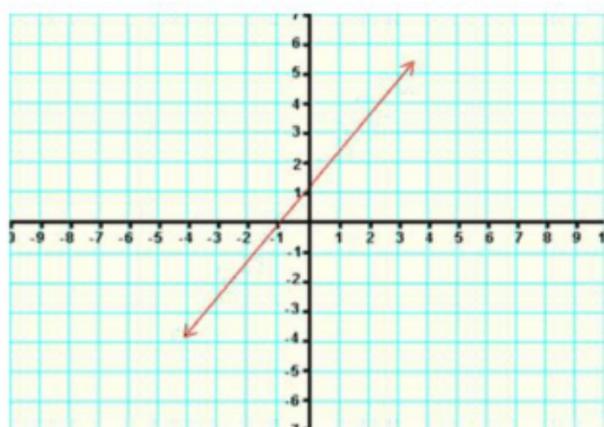
Undefined Slope

- A line that is an undefined slope is a vertical line.
- The m value will come out to be a non-zero number over 0.
- An equation that is $x =$ a number will always have an undefined slope.

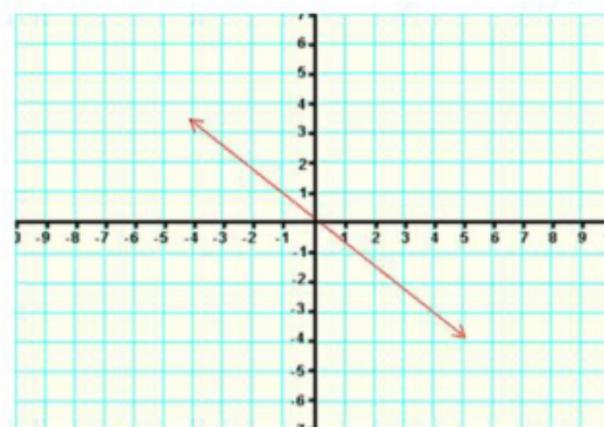
$$m = \frac{5}{0} = \text{undefined}$$



Describe the Slope of the Following:

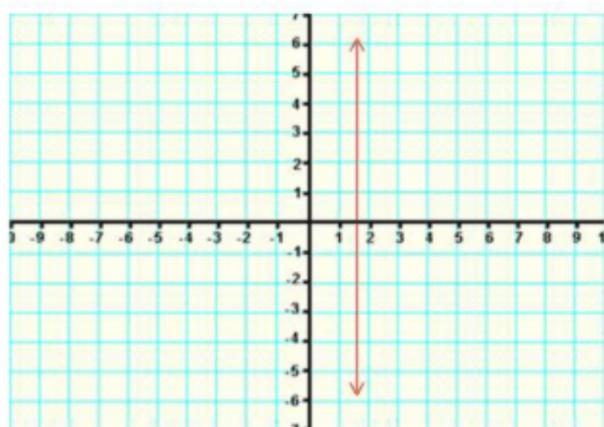


Rising: Positive Slope

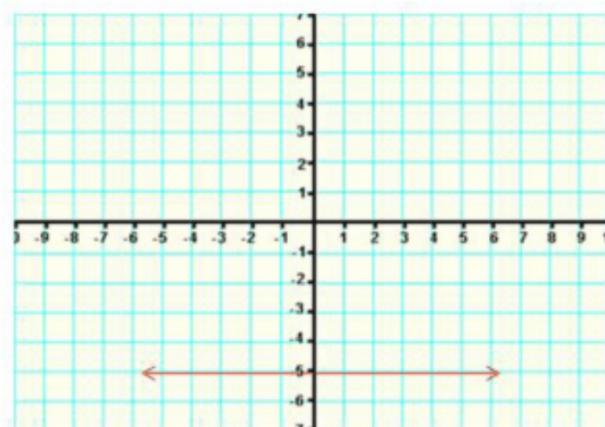


Falling: Negative Slope

Describe the Slope of the Following:

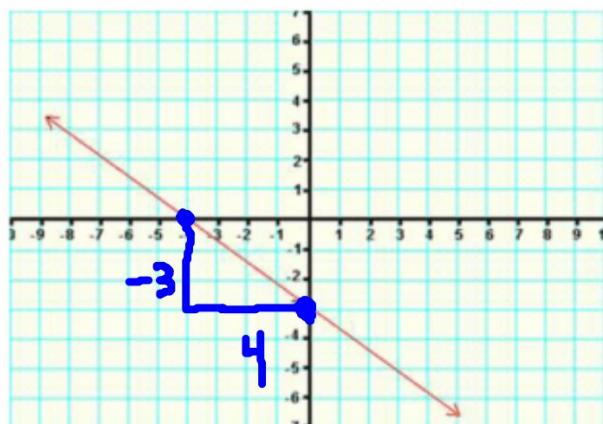
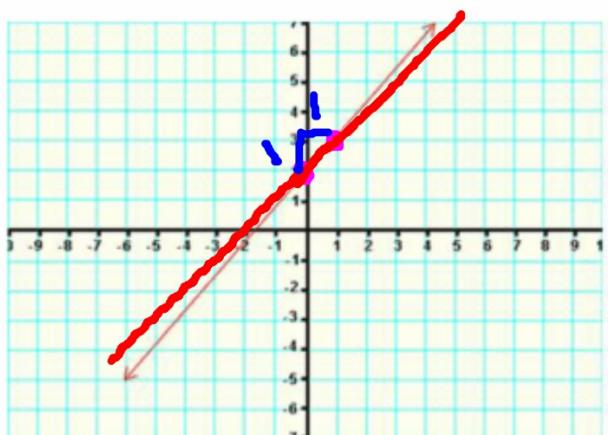


Vertical Line: Undefined Slope



Horizontal Line: Zero Slope

Find the slope?



$$\frac{\text{rise}}{\text{run}} = \frac{1}{1} = 1$$

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

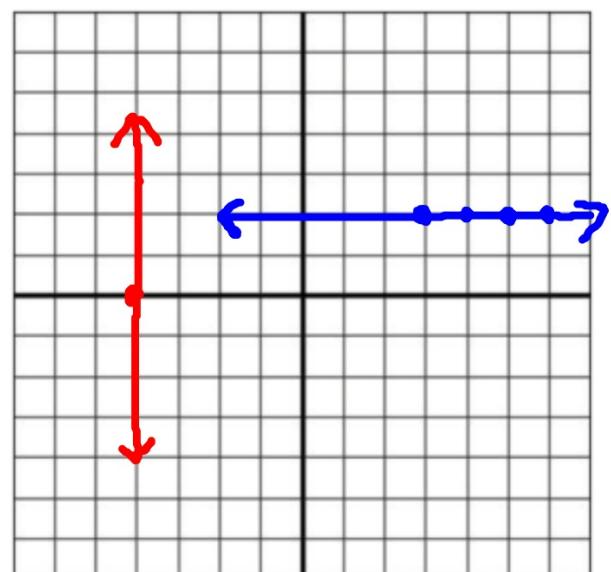
Special slope

- Parallel lines have the same slope.
- Perpendicular lines have negative reciprocal slope.
- Examples:
 - 1.) $m = -3/4$ $m = \frac{4}{3}$
 - 2.) $m = 8$ $m = -\frac{1}{8}$
 - 3.) $m = 0$ $m = 0$
 - 4.) $m = 1/6$ $m = -6$

Graphing

□ $(3, 2)$ $m = \frac{0}{1}$

□ $(-4, 0)$ $m = \text{U}$



Writing Equations of Lines

$$y = mx + b$$

Slope-Intercept

□ 1.) $m = 7, b = 2$

$$y = mx + b$$

$$y = 7x + 2$$

□ 3.) $m = -2, (0, -7)$

$$y = -2x - 7$$

□ 2.) $m = -1/2,$

$y\text{-int} = 7$

$$y = -\frac{1}{2}x + 7$$

□ 4.) $m = 0, (0, 4)$

$$y = 0x + 4$$

$$y = 4$$

Given point and slope

□ 1.) $m = 2, (3, -4)$

$$\begin{aligned}y &= mx + b \\-4 &= 2(3) + b \\-4 &= 6 + b \\-10 &= b\end{aligned}$$

$$y = 2x - 10$$

□ 2.) $m = -2/3, (6, 4)$

$$\begin{aligned}y &= mx + b \\4 &= -\frac{2}{3}(6) + b \\4 &= -4 + b \\8 &= b\end{aligned}$$

$$y = -\frac{2}{3}x + 8$$

Given 2 points

□ 1.) (6, 3), (4, 7)

$$m = \frac{7-3}{4-6} = \frac{4}{-2} = -2$$

$$y = mx + b$$

$$3 = -2(6) + b$$

$$3 = -12 + b$$

$$15 = b$$

$$y = -2x + 15$$

□ 2.) (-9, 1), (3, 7)

$$m = \frac{7-1}{3+9} = \frac{6}{12} = \frac{1}{2}$$

$$y = mx + b$$

$$7 = \frac{1}{2}(3) + b$$

$$7 = 1.5 + b$$

$$5.5 = b$$

$$y = \frac{1}{2}x + \frac{11}{2}$$

Class Work

- Pg 36 # 95-97, 101-105, 109



Homework

- Pg 34-35 # 1, 2, 5-15 odd/39-45 odd/51-54,
65, 66