

Name Kerry  
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Date \_\_\_\_\_  
8R Period \_\_\_\_\_

**Slope**

**SLOPE OF A LINE**

The rise is the difference of the y-values of two points on a line.

The run is the difference in the x-values of two points on a line.

The slope of a line is the ratio of rise to run for any two points on the line.

slope =  $\frac{\text{rise}}{\text{run}} = \frac{\text{change in } y}{\text{change in } x}$

(Remember that  $y$  is the dependent variable and  $x$  is the independent variable.)

\*\*The slope of a line is also known as a rate of change (& ratio)

**I. Slope of two coordinates**

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

- Steps: 1) Label the coordinates  
2) Plug in the values  
3) Simplify

Ex: What is the slope of the graph of the line passing through the points:

1)  $(1, 6) \& (4, 8)$   
 $x_1, y_1 \quad x_2, y_2$

$m = \frac{y_2 - y_1}{x_2 - x_1}$   
 $m = \frac{8 - 6}{4 - 1} = \frac{2}{3}$      **$m = \frac{2}{3}$**

2)  $(5, 11) \& (3, 7)$   
 $x_1, y_1 \quad x_2, y_2$

$m = \frac{y_2 - y_1}{x_2 - x_1}$   
 $m = \frac{7 - 11}{3 - 5} = \frac{-4}{-2} = 2$      **$m = 2$**

3)  $(4, 10) \& (6, 8)$   
 $x_1, y_1 \quad x_2, y_2$

$m = \frac{y_2 - y_1}{x_2 - x_1}$   
 $m = \frac{8 - 10}{6 - 4} = \frac{-2}{2} = -1$      **$m = -1$**

4)  $(6, 7) \& (9, 13)$   
 $x_1, y_1 \quad x_2, y_2$

$m = \frac{y_2 - y_1}{x_2 - x_1}$   
 $m = \frac{13 - 7}{9 - 6} = \frac{6}{3} = 2$      **$m = 2$**

- 1) Find the slope of the line that contains the points (2, 1) and (5, 7) and describe the direction of the line.

$x_1, y_1$      $x_2, y_2$

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

$$m = \frac{7-1}{5-2} = m = \frac{6}{3} \quad \boxed{m=2} \text{ Right}$$

- 2) Find the slope of the line that contains the points (-10, 3) and (-8, -1) and describe the direction of the line.

$x_1, y_1$      $x_2, y_2$

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

$$m = \frac{(-1) - 3}{(-8) - (-10)} = m = \frac{-4}{2} \quad \boxed{m=-2} \text{ left}$$

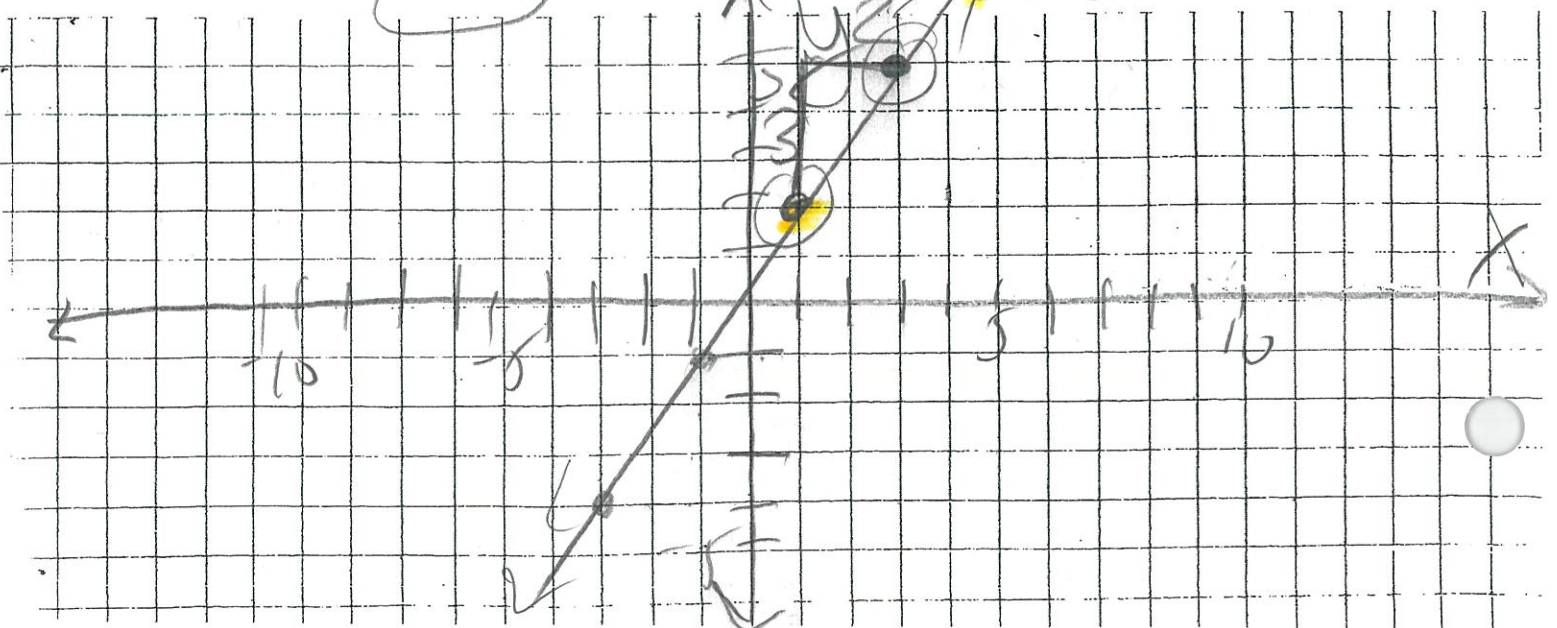
- 3) Find the slope of the line  $y = -4x + 5$  and describe the direction of the line.

$$y = mx + b$$

$$\boxed{\text{Slope} = -4} \text{ left}$$

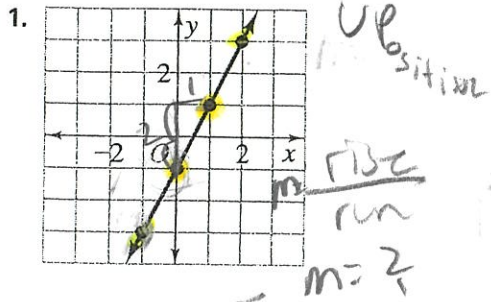
- 4) Through the point (1, 2) draw the line whose slope is  $\frac{3}{2}$ .

rise  
run

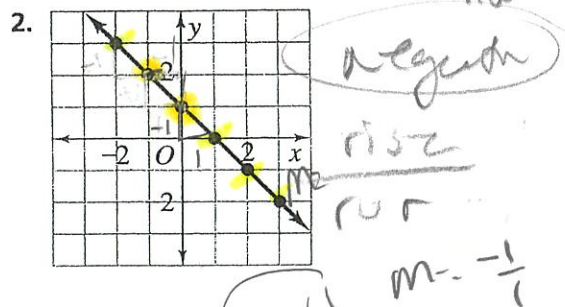


**EXERCISES On Your Own**

Find the slope of each line.



Slope = 2  $m = 2$



Slope = -1  $m = -1$

3. **Writing** Explain which roof is steeper: a roof with a rise of 5 and a run of 3 or a roof with a rise of 3 and a run of 5.

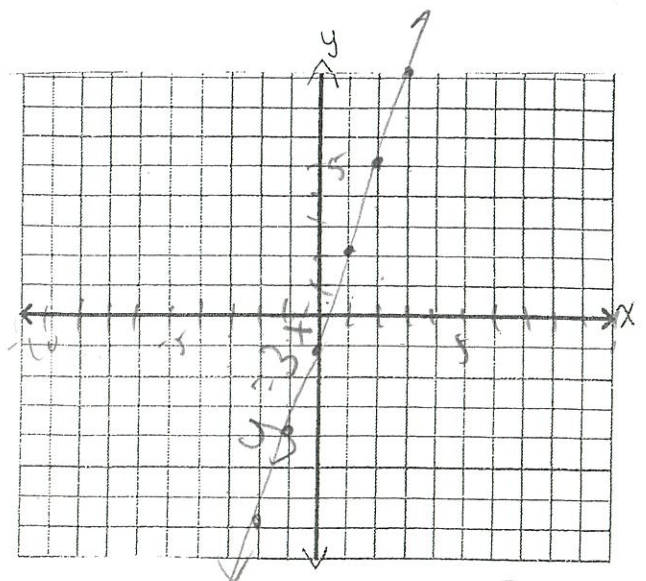
$\frac{5}{3} = 1.\bar{6}$        $\frac{3}{5} = .6$

\* The roof w/ a rise of 5 and a run of 3 is steeper b/c it has a larger absolute value slope.

For each linear equation, make a table of solutions. Then graph the line and find the slope.

4.  $y = 3x - 1$   
 $y = mx + b$   $m = \text{Slope} = 3$   
 $b = y\text{-int} = -1$

X	Y
-3	-10
-2	-7
-1	-4
0	-1
1	2
2	5



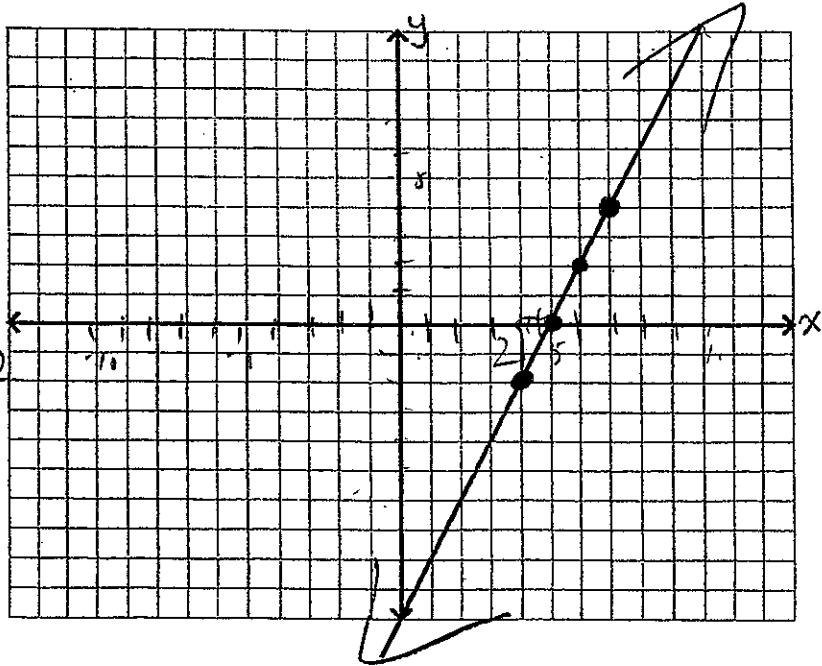
\* Turn Over \*

5. The points from each table lie on a line. Find the slope of the line. Then graph the line.

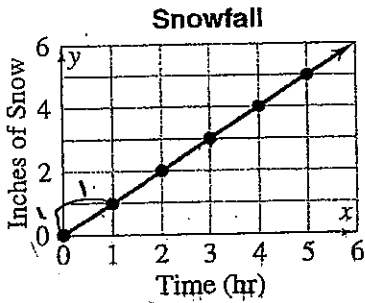
4	5	6	7
2	0	2	4

Slope = 2

rise  
run  
 $\frac{2}{1} = 2$



6. Find the slope of the line. Describe how one variable changes in relation to the other.



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

Slope = 1

The snow increases  
 1 inch per 1 hour

$\frac{\text{rise}}{\text{run}} = \frac{\Delta y}{\Delta x} = \frac{\Delta \text{Inches of Snow}}{\Delta \text{Time (hr)}} = \frac{1}{1}$