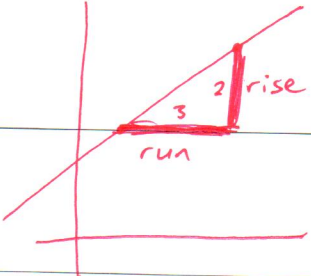



SECTION 3.2 SLOPE

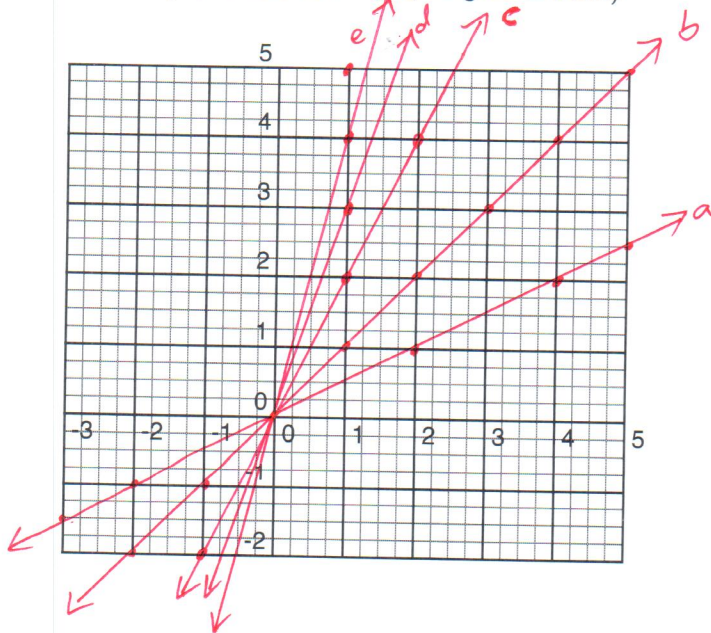
Name: Key Date: \_\_\_\_\_ Period: \_\_\_\_\_

Vocabulary

DEFINITION	EXAMPLE
Rise vertical movement	
Run horizontal movement to the right	
Slope ratio of rise to run $\frac{\text{rise}}{\text{run}}$	$\text{slope} = m = \frac{2}{3}$

**EXPLORATION 3**

1. Compare the graphs of the lines given by the following 5 equations. Do you need to make tables? (Optional: Use a graphing calculator.)



- a  $y = \frac{1}{2}x$
- b  $y = x$
- c  $y = 2x$
- d  $y = 3x$
- e  $y = 4x$

2. How are the graphs similar? How are they different? *Answers will vary.*

Similarities	Differences
<p><i>All pass through the origin.</i></p> <p><i>All are straight lines (linear).</i></p> <p><i>All slant up.</i></p> <p><i>All are positive.</i></p>	<p><i>Different slopes.</i></p> <p><i>Different "steepness"</i></p> <p><i>Not parallel</i></p> <p><i>Intersect at different angles</i></p> <p><i>Some are integers, some are fractions</i></p>

*Answers may vary.*

3. What is the equation for another line that would be steeper than all of them?

$y = 5x$

4. What is the equation for another line that would be flatter than all of them?

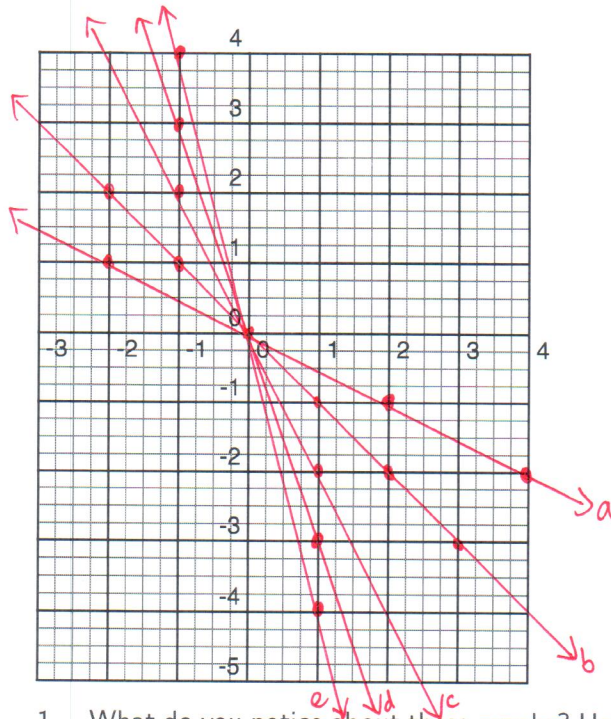
$y = \frac{1}{3}x$

5. Describe where the graph of the line  $y = 2.5x$  would be compared to lines graphed above.

*between lines c and d (because the slope is between the slopes 2 and 3).*

EXPLORATION 4

Compare the graphs of the line given by the following 5 equations. Do you need to make tables? (Optional: Use a graphing calculator.)



- a  $y = -\frac{1}{2}x$
- b  $y = -x$
- c  $y = -2x$
- d  $y = -3x$
- e  $y = -4x$

1. What do you notice about these graphs? How are the graphs similar? How are they different?

Similarities	Differences
<p>All slant down.                      All pass through origin.                      All are negative.                      All are linear (straight lines).</p>	<p>Different slopes                      Not parallel                      Intersect at different angles                      Some integer slopes, some fraction slopes.</p>

2. Describe where the graph of the line  $y = -1.5x$  would be compared to lines graphed above.

between b and c, since  $-1.5x$  is between  $-1x$  and  $-2x$

**EXPLORATION 5**

1. Compare the graphs in Exploration 3 and 4. How are they similar? How are they different?

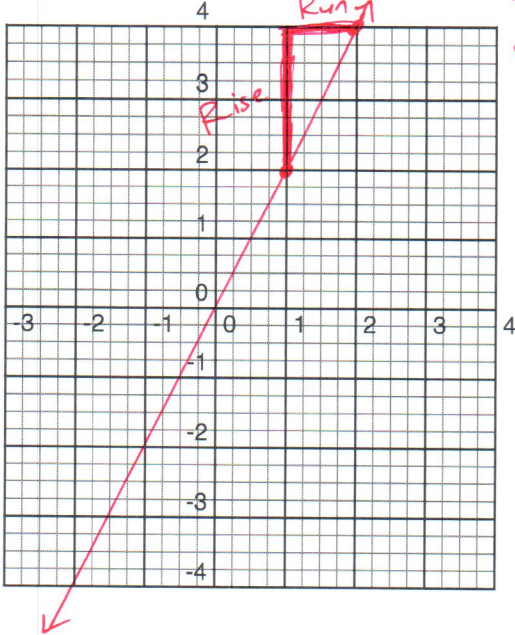
Similarities	Differences
Linear Pass through origin Only in 2 quadrants	Some slope up & some slope down. Positive vs. negative slopes.

2. The equations have the form  $y = mx$ . What does the number  $m$  tell you about the graph of the line?

The steepness of the graph.  
Whether the line goes up or down as you follow it left to right.  
Etc.

**EXAMPLE 1**

Graph the straight line corresponding to the equation  $y = 2x$ . Compute at least 6 ordered pairs to plot as points on this line with  $x$ -values of  $-2, -1, 0, 1, 2, 3$ .



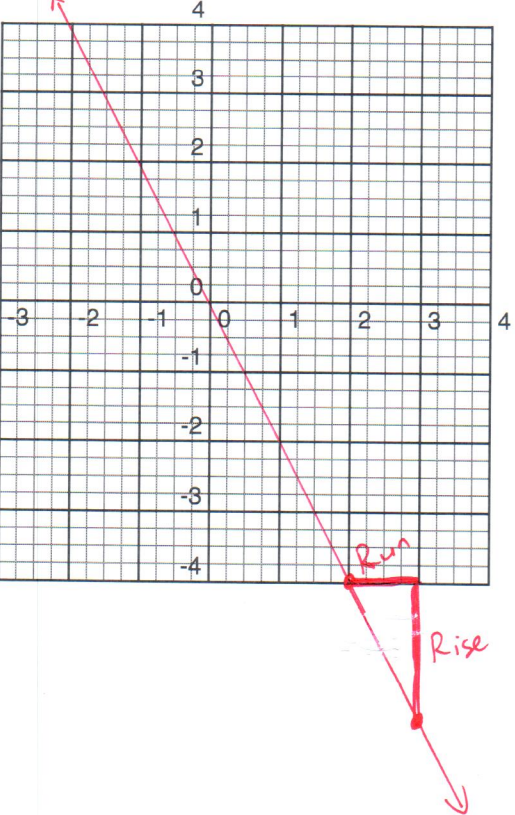
$x$	-2	-1	0	1	2	3
$y$	-4	-2	0	2	4	6

1. Plot (1, 2), (2, 4).
2. Shade segment between (1, 2) and (1, 4). Label it "Run". "Rise"
3. Shade segment between (1, 4) and (2, 4). Label it "Rise". "Run"

4. Compute  $\frac{\text{Rise}}{\text{Run}}$ .  $\frac{2}{1} = 2$

**EXAMPLE 2**

Graph the straight line corresponding to the equation  $y = -2x$ . Compute at least 6 ordered pairs to plot as points on this line with  $x$ -values of  $-2, -1, 0, 1, 2, 3$ . Make a triangle that visually shows the slope.



$x$	-2	-1	0	1	2	3
$y$	4	2	0	-2	-4	-6

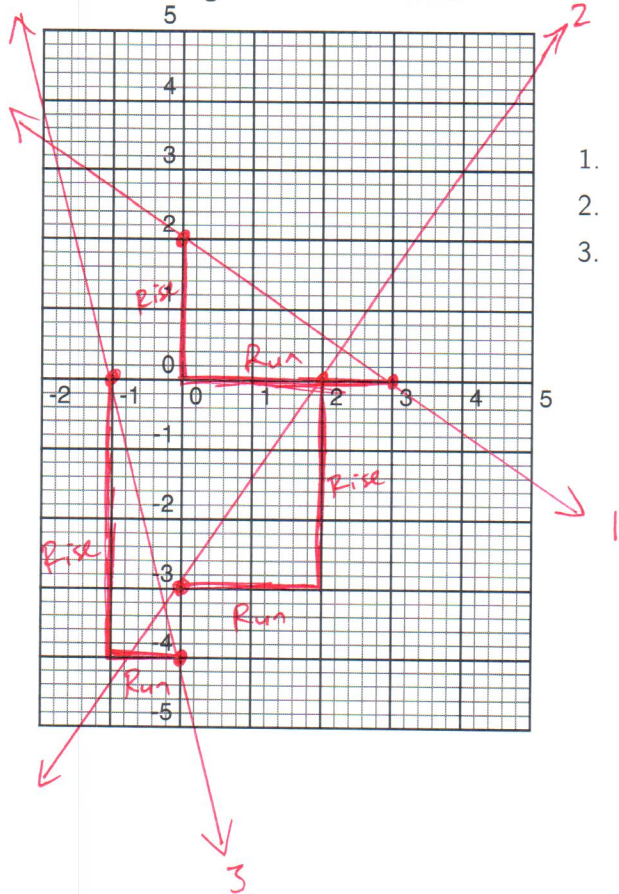
1. Plot (2, -4), (3, -6).
2. Shade segment between (2, -4) and (3, -4). Label it "Run".
3. Shade segment between (3, -4) and (2, -4). Label it "Rise". Why is rise negative?

The line slopes downward from left to right.

4. Compute  $\frac{\text{Rise}}{\text{Run}}$ .  $\frac{-2}{1} = -2$

**EXAMPLE 3**

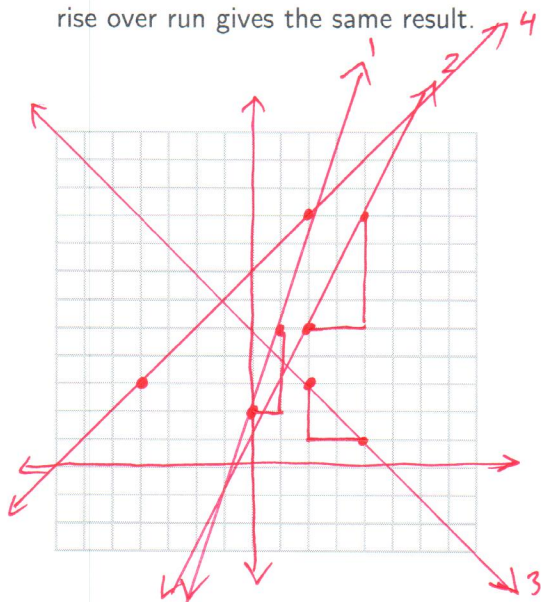
For each pair of points below, find the slope of the straight line with these two points using the formula in the definition. Sketch a graph of each line and verify, by drawing a triangle, that the rise over run gives the same result.



1.  $(0, 2)$  and  $(3, 0)$   $-\frac{2}{3}$
2.  $(0, -3)$  and  $(2, 0)$   $\frac{3}{2}$
3.  $(0, -4)$  and  $(-1, 0)$   $\frac{-4}{1} = -4$

**PROBLEM 4**

For each pair of points below, find the slope of the straight line with these two points using the formula in the definition. Sketch a graph of each line and verify by drawing a triangle that the rise over run gives the same result.



1. (0, 2) and (1, 5)  $\frac{3}{1} = 3$
2. (2, 5) and (4, 9)  $\frac{4}{2} = 2$
3. (2, 3) and (4, 1)  $\frac{-2}{2} = -1$
4. (-4, 3) and (2, 9)  $\frac{6}{6} = 1$

**SUMMARY (What I learned today)**

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