

Rate of Change and Slope

Chapter 6 – Linear Equations

Warm Up for 11/12/08

- Lesson Quiz 5-1
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Rate of Change

- A **rate of change** is a ratio that shows a change in one quantity with respect to a change in another quantity.

$$\text{Rate of Change} = \frac{\text{change in the dependent variable}}{\text{change in the independent variable}}$$

Rate of Change

□ Example

- Find the rate of change for both Greg and Monica.
- Keep in mind that the earnings are dependent on the hours worked

Hours Worked	Earnings (\$)	
	Greg	Monica
1	4	5
2	8	10
3	12	15
4	16	20

Rate of Change

$$\text{Rate of change} = \frac{\text{change in earnings}}{\text{change in hours worked}}$$

$$\frac{\text{change in earnings}}{\text{change in hours worked}} = \frac{4}{1}$$

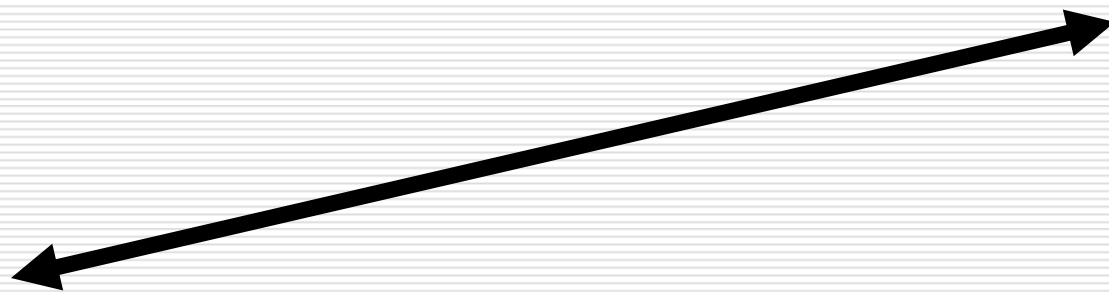
Hours Worked	Earnings (\$)	
	Greg	Monica
1	4	5
2	8	10
3	12	15
4	16	20

Slopes are commonly associated with mountains.



Slope

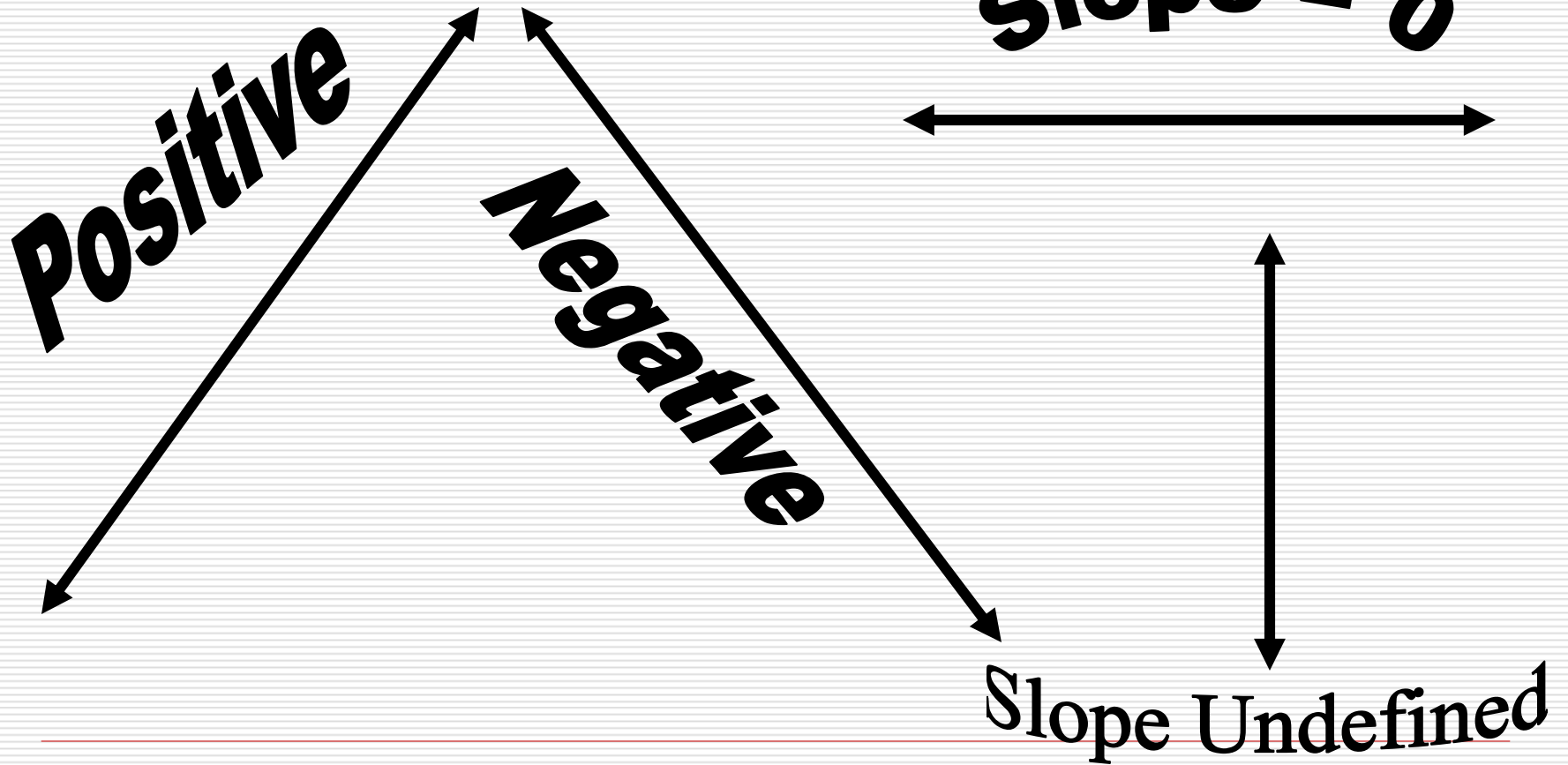
The slope we are studying is associated with the graph of a line.



Slope

- When you graph a straight line, it's going to look like you're either going up a mountain slope or down a mountain slope.
 - Positive slope – uphill
 - Negative slope - downhill
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Slope



Slope Definitions

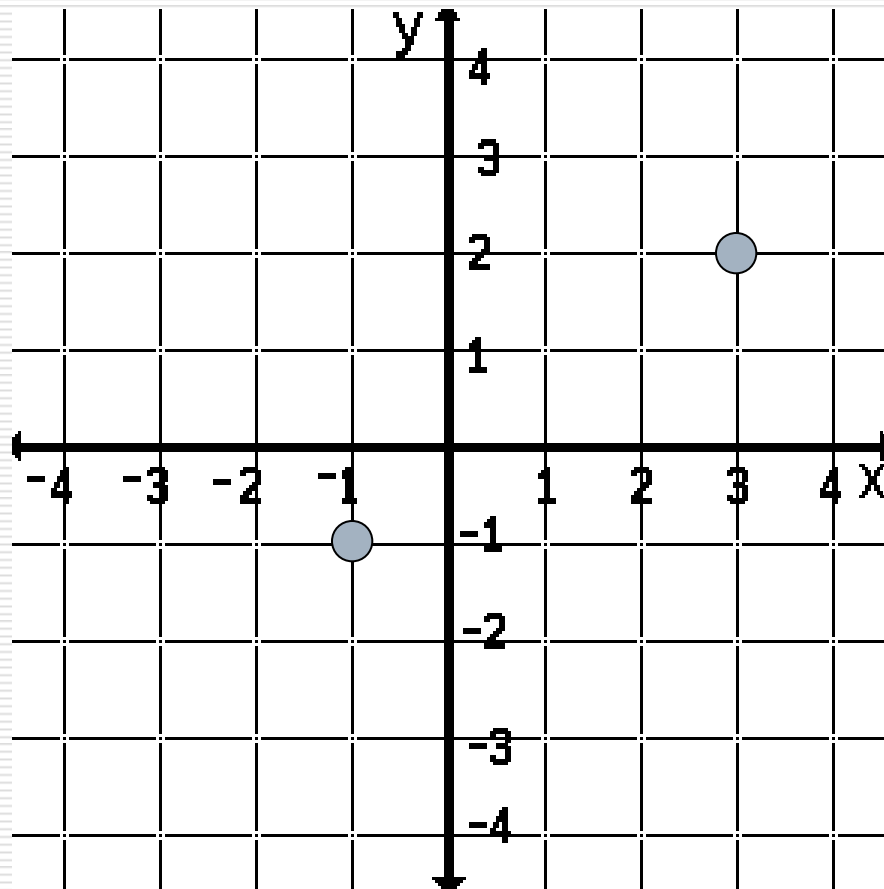
□ Slope is the change in y versus the change in x .

□ $\frac{\text{Change in } y}{\text{Change in } x}$

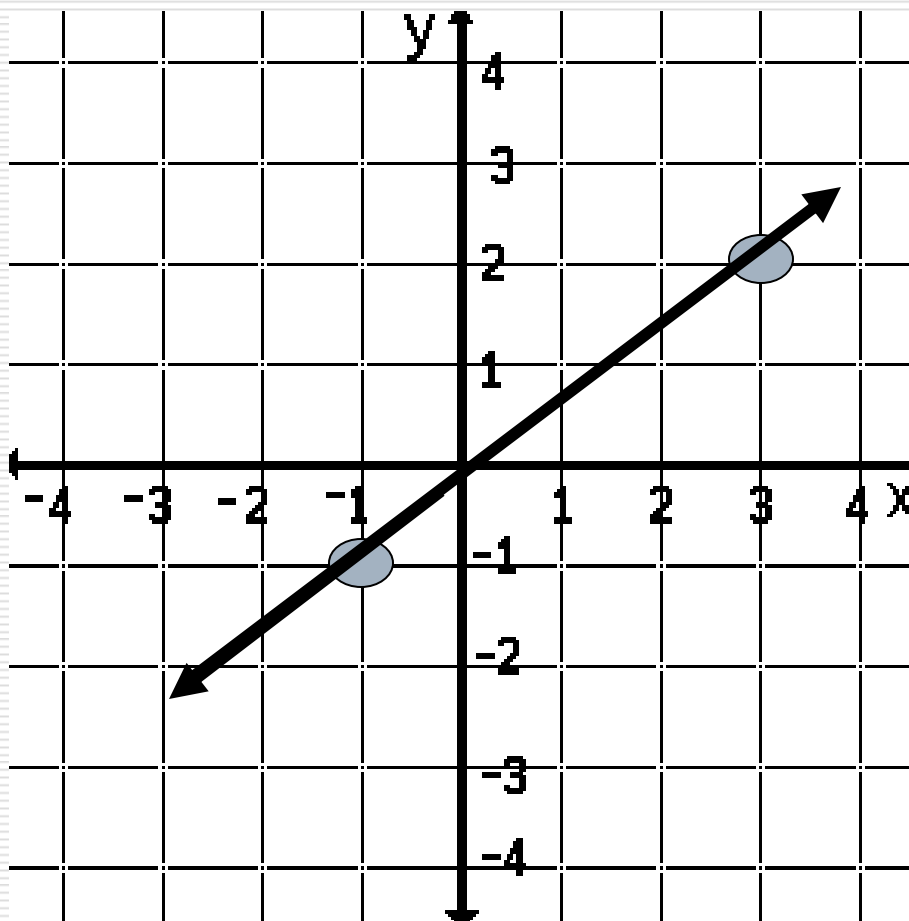
□ $\frac{\text{Rise}}{\text{Run}}$

□ When you graph a line, if you start at one point, you have to go up and over (or down and back) to get to the next point.

Graph $(3,2)$ and $(-1,-1)$



Draw a line through the points.

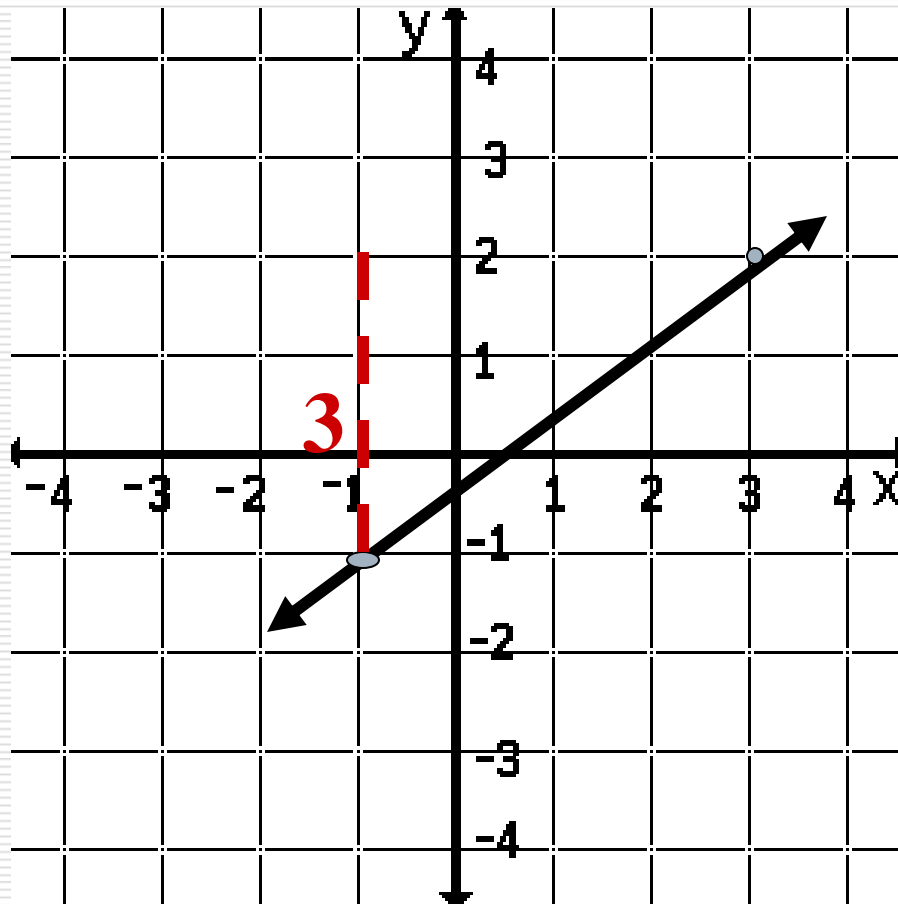


Now that we have our line lets
find its slope.

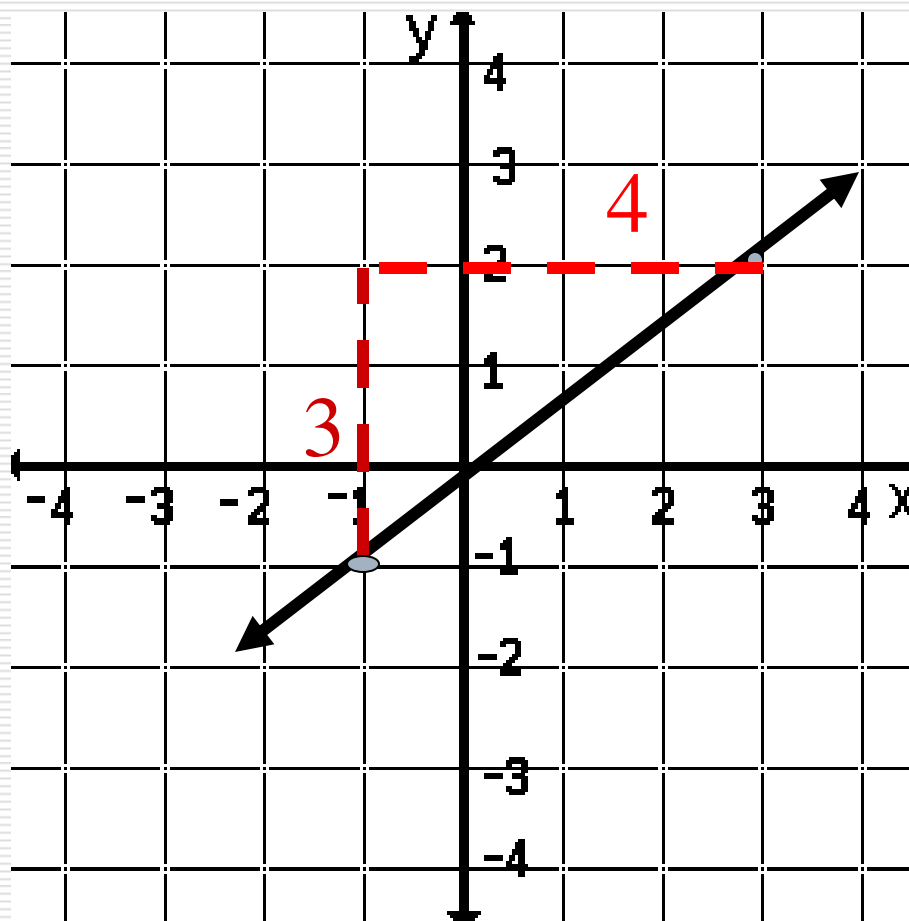
Remember we are finding the following ratio:

$$\frac{\text{Vertical}}{\text{Horizontal}} \quad \text{or} \quad \frac{\text{Rise}}{\text{Run}}$$

Vertical Change or the Rise



Horizontal Change or the Run



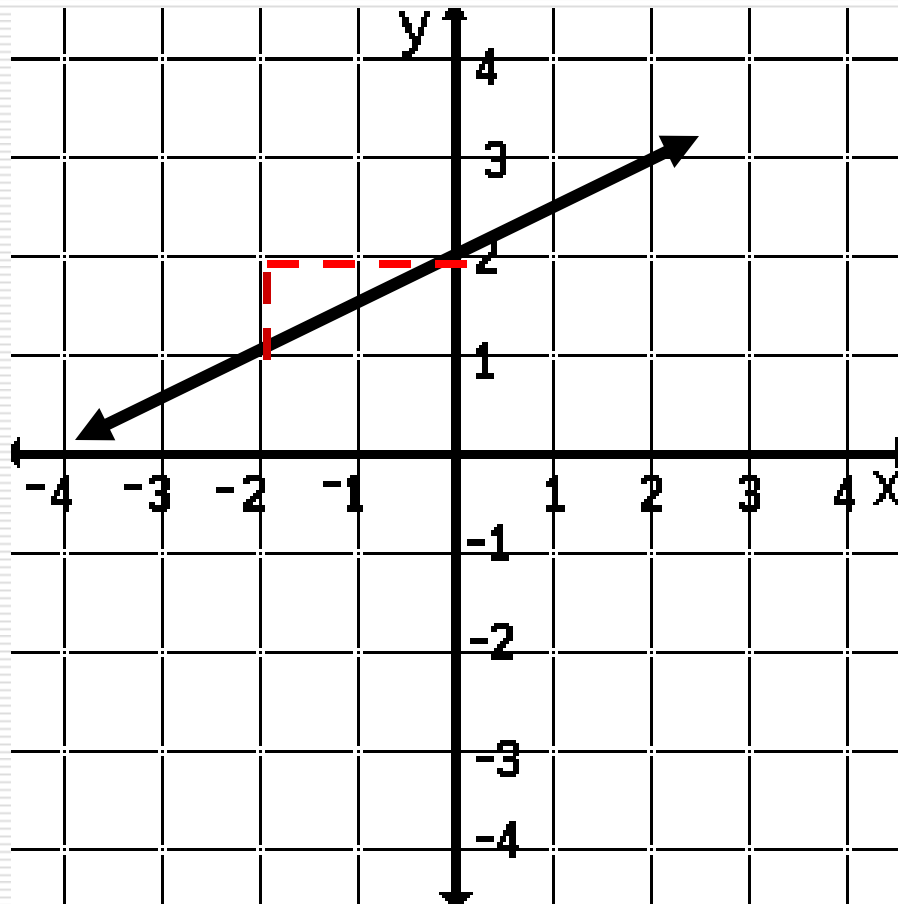
Vertical
Horizontal

3

4

Rise
Run

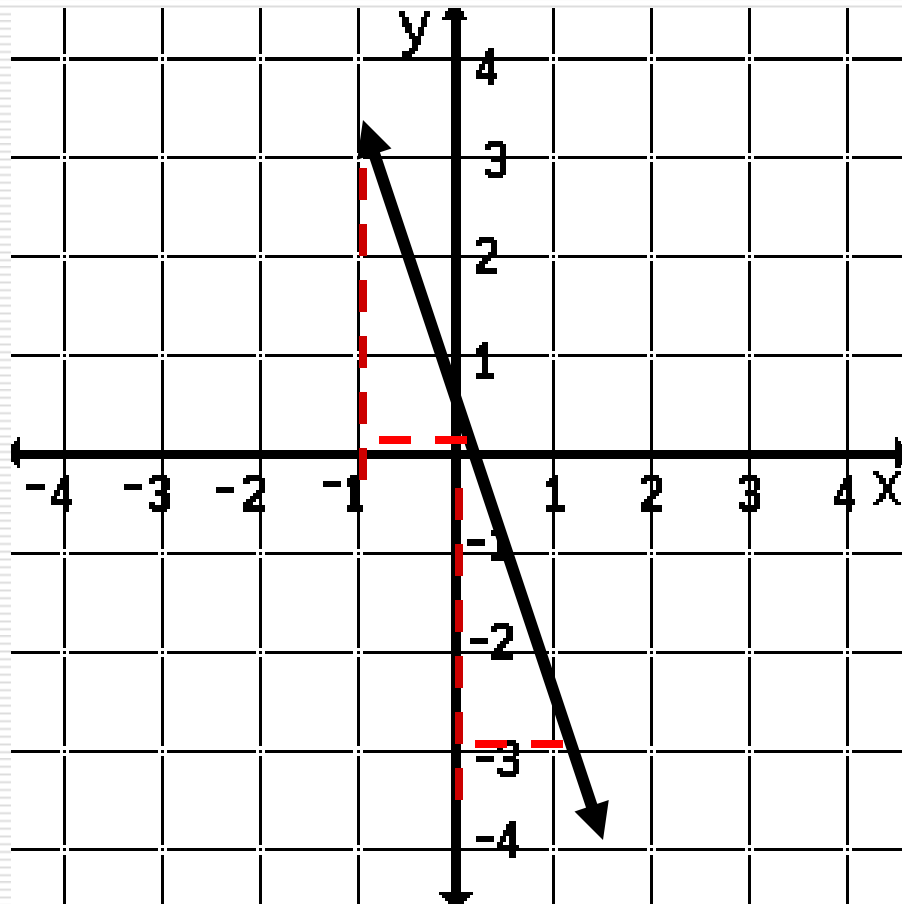
Find the slope of the following line.



The slope is...

$$\frac{1}{2}$$

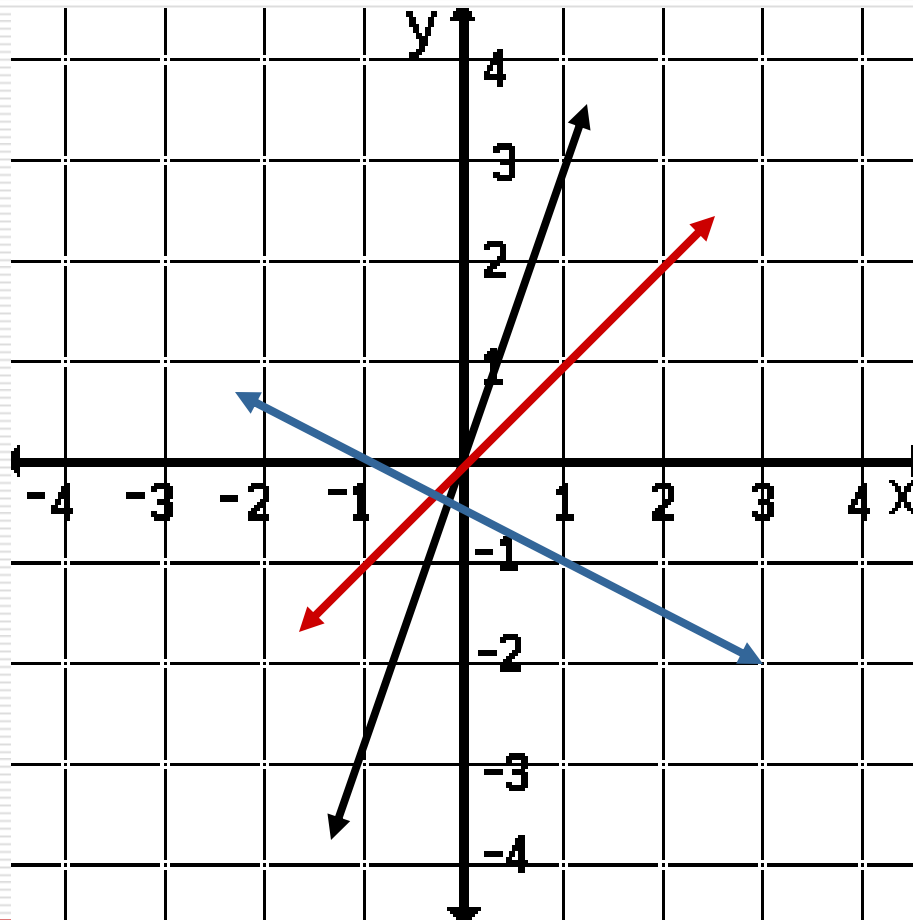
Find the slope of the line.



The slope is....

-3

Find the slope of these lines.



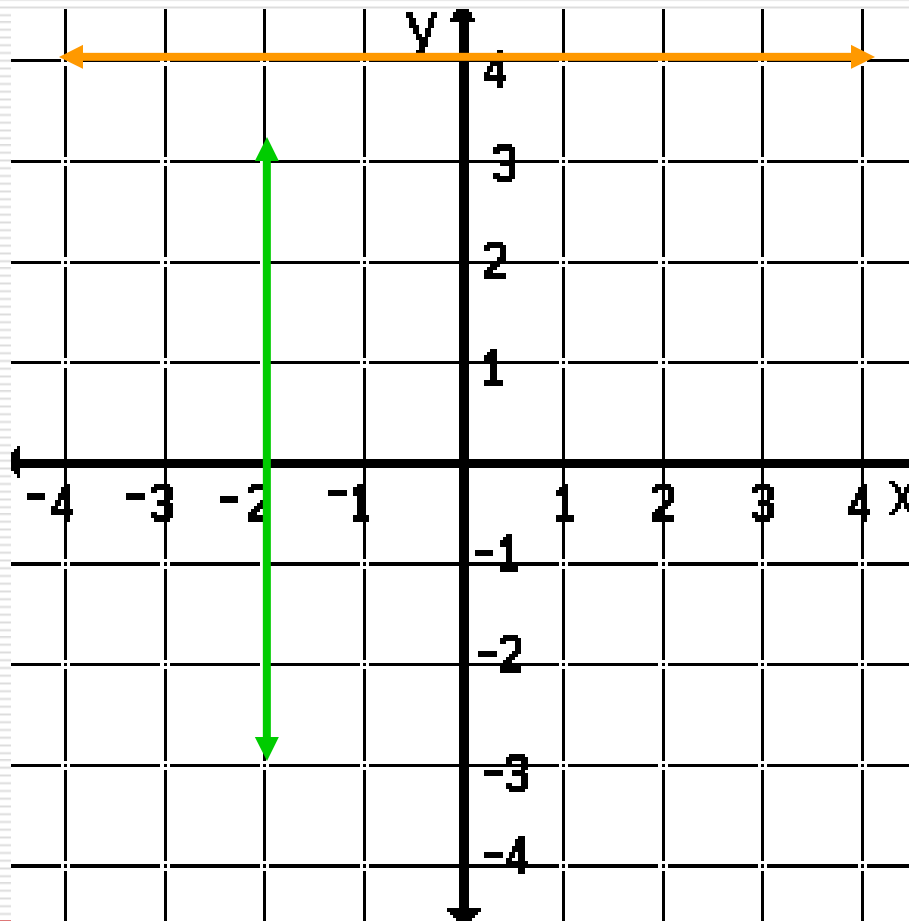
The slope is...

Black line 3

Red Line 1

Blue Line $-1/2$

Find the slope of these lines



The slope is...

Orange line 0

Green Line Undefined

Finding Slope

□ Given $(-2, 0)$ and $(1, 3)$, find the slope.

□ $\frac{\text{Change in } y}{\text{Change in } x} = \frac{0 - 3}{-2 - 1} = -3 / -3 = 1 = \frac{1}{1}$

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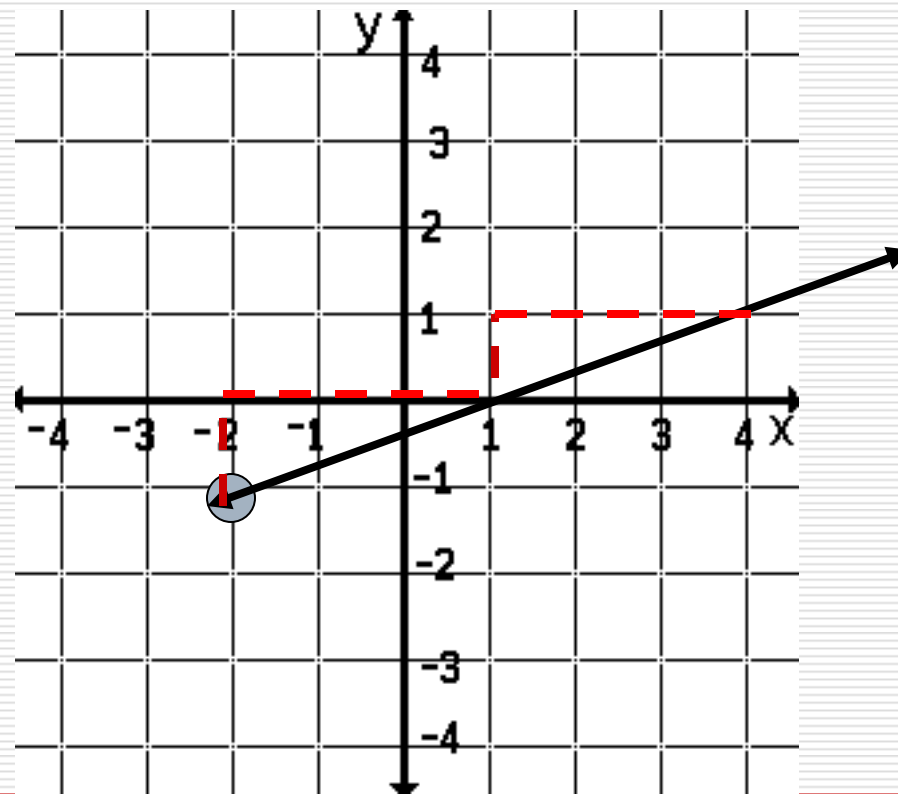
□ If I start at $(-2, 0)$, I have to go up 1 and to the right 1 to get closer to $(1, 3)$

Let's draw a line using slope.

What else do you think you need besides the slope in order to draw a line?

A point!

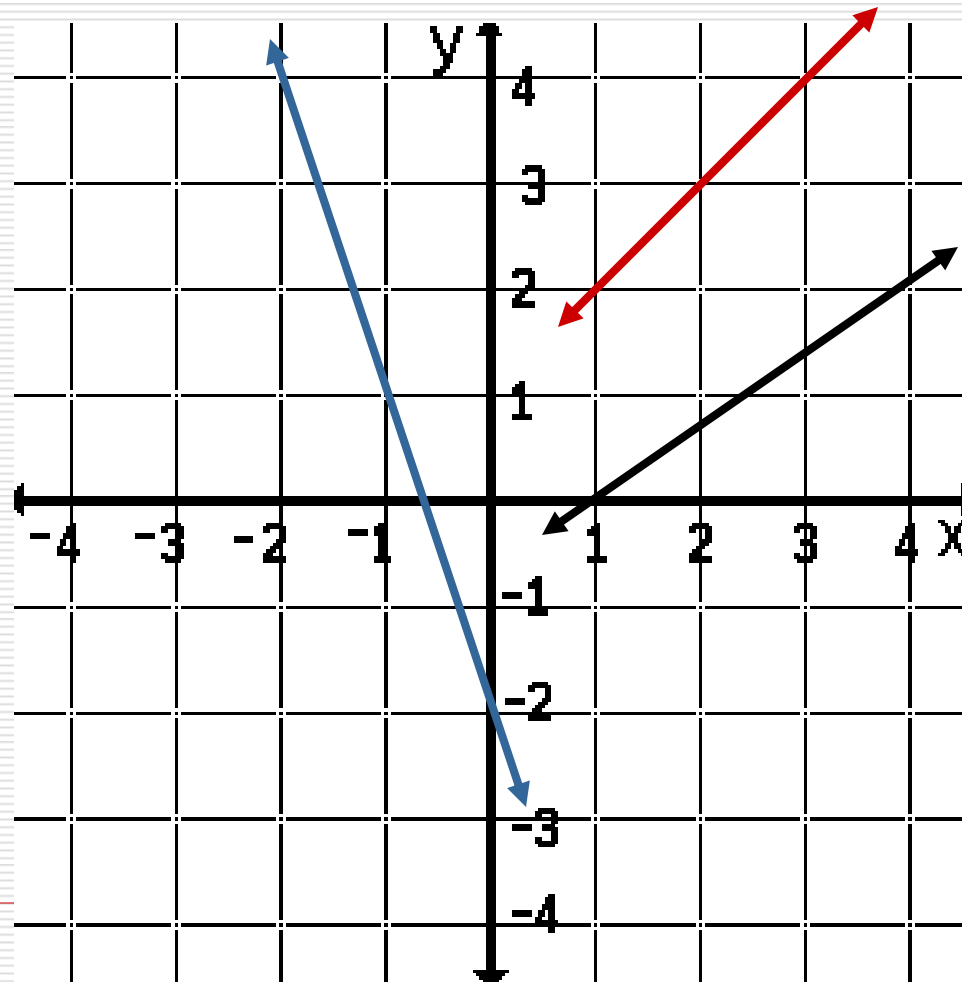
If you know the slope and one point on the line you can draw the line.
Example: slope is $\frac{1}{3}$ and the point $(-2, -1)$



Now you draw a line.

- Given: slope is $\frac{2}{3}$ and the point is $(1,0)$
 - Given: slope is -3 and the point is $(-2,4)$
 - Given: slope is 1 and the point is $(2,3)$
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The graphs are...



Homework for 11/12/08

- Book pages 287 – 288; #28 – 62, even
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