

Name: _____

Date: Oct 29

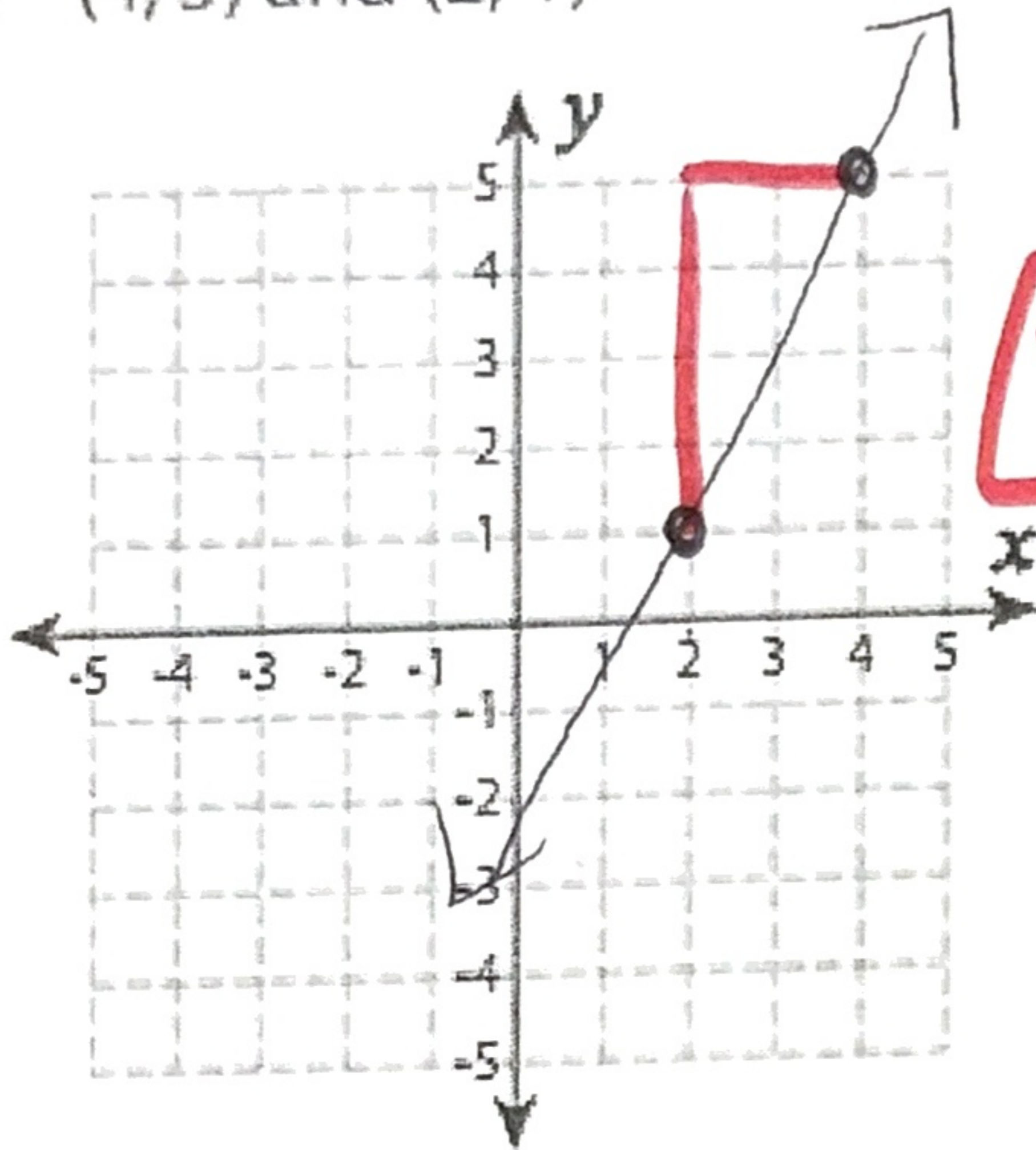
Hour: ___ Alg 1 ___

Unit 3a Day 6: Rate of Change Given 2 Points

Focus Question: What are some strategies for finding the rate of change when I only know two points on a line?

- A. Two points: From a Picture to a Formula
- 1. Graph and find the rate of change between the two points

6) (4, 5) and (2, 1)



x	y
4 - 2	5 - 1
2	4

- 2. Turn the two points into a table and find the rate of change.

$$\frac{\Delta y}{\Delta x} = \frac{-4}{-2} = \boxed{2}$$

- 3. When you find the change in the table, what operation are you doing?

Subtraction

$$1 - 5 = -4$$

$$2 - 4 = -2$$

- 4. When Ms. Millett was 9 months pregnant, she weighed 170 pounds. Before she was pregnant she weighed 130 pounds. How much did her weight change? (What operation did you do?)

$$170 - 130 = 40$$

After (2nd point in time) Before (1st point in time)

Subtraction

- 5. Remember how mathematicians think of rate of change. They have a formula they use to help them calculate it.

$$m = \text{Rate of change} = \frac{\text{rise}}{\text{run}} = \frac{\text{vertical change}}{\text{horizontal change}} = \frac{\text{change in } y}{\text{change in } x} = \frac{\text{change in dependent}}{\text{change in independent}} = \frac{\Delta y}{\Delta x}$$

Slope We left off at "change in y over change in x." What operation finds "change?" Subtraction

- 6. The mathematician's formula for slope is below.

$$\frac{\Delta y}{\Delta x} = \frac{y_2 - y_1}{x_2 - x_1}$$

- a) The notation y_2 means the y value of the 2nd point. It uses subscript to tell you which point the value should come from.

- b) It is correct to say either "y sub 2" or "y 2"

- c) Let's say the whole formula together.

- d) Now show how to use the formula using the two points above. $(4, 5)$ $(2, 1)$

$$\frac{\Delta y}{\Delta x} = \frac{1 - 5}{2 - 4} = \frac{-4}{-2} = \boxed{m = 2}$$

B. Labeling point 1 and point 2

1. Use the formula to find the rate of change between (4, 7) and (5, -1)

$$\frac{\Delta y}{\Delta x} = \frac{y_2 - y_1}{x_2 - x_1}$$

$$m = \frac{-1 - 7}{5 - 4} = \frac{-8}{1}$$

$$m = -8$$

2. Use the formula to find the rate of change between (5, -1) and (4, 7)

$$\frac{\Delta y}{\Delta x} = \frac{7 - (-1)}{4 - 5} = \frac{8}{-1}$$

$$m = -8$$

3. The two problems above just had the points reversed, so does it matter which point you use as point 1?

Explain? No you get the same answer

4. Is $\frac{-3}{2} = \frac{3}{-2} = -\frac{3}{2}$? Explain

Yes, where the negative is doesn't matter as long as there is 1.

$$\frac{-3}{-2} = +\frac{3}{2}$$

C. Practice Finding the rate of change algebraically

1) (2, -7) and (-1, 6)
 x_1, y_1 x_2, y_2

$$\frac{\Delta y}{\Delta x} = \frac{6 - (-7)}{-1 - 2} = \frac{13}{-3}$$

$$m = -\frac{13}{3}$$

2) (-3, 3) and (7, 6)

$$\frac{6 - 3}{7 - (-3)} = \frac{3}{10}$$

$$m = \frac{3}{10}$$

3) (-1, -9) and (5, -6)

$$\frac{-6 - (-9)}{5 - (-1)} = \frac{3}{6}$$

$$m = \frac{1}{2}$$

4) (-4, 9) and (-5, 8)

$$\frac{8 - 9}{-5 - (-4)} = \frac{-1}{-1}$$

$$m = 1$$

5) (5, 10) and (5, -2)

$$\frac{-2 - 10}{5 - 5} = \frac{-12}{0}$$

$$m = \phi$$

$$x = 5$$

6) (-2, 7) and (3, 7)

$$\frac{7 - 7}{3 - (-2)} = \frac{0}{5}$$

$$m = 0$$

$$y = 7$$

$$\text{or } f(x) = 7$$