CH.2, L2 – LINEAR ROC OF EQUATIONS

Objective: Given an equation, I will determine and interpret the rate of change of a linear function.

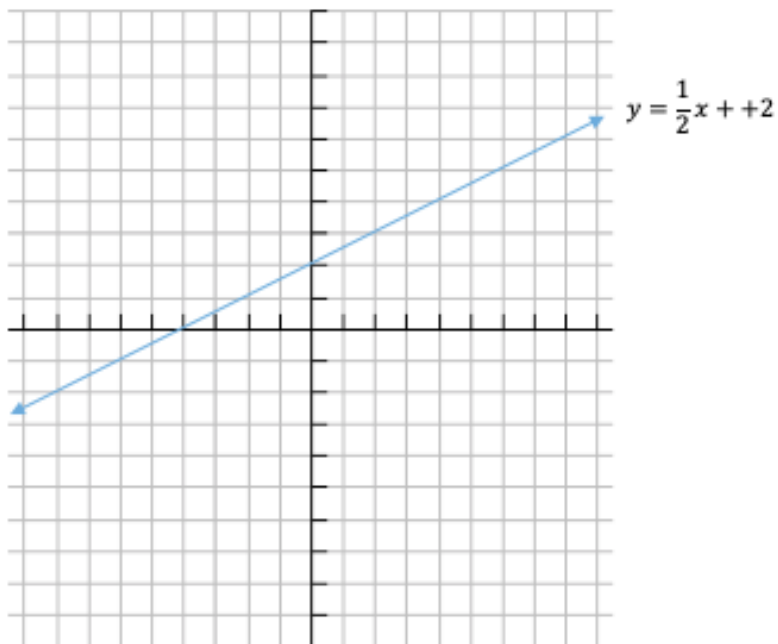**Think About It:** Complete the following steps given the two equations:

$$y = \frac{1}{2}x + 2 \qquad \text{and} \qquad 4x + 2y = 2$$

Step A: Determine the rate of change for both equations.

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Step B: The first equation is graphed for you. Graph and label the second equations to identify which line is steeper.

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

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Big Idea: Rates of change are compared by their absolute values.

CFS:
1. Important information is highlighted and question/prompt is circled
2. When needed, equations/functions are rewritten in slope-intercept form
3. Rates of change are identified and units are include when available
4. Rates are compared with the absolute value
5. Question/prompt is addressed in a complete sentence

　Name: _____ Period: _____ Date: _____

Interaction with New Material:

Ex. 1) Four different birds are released from captivity at the same time. All the birds take flight starting at 10 feet off the ground and their altitude is recorded each second. One researcher records the flight of Bird A in a table. Another researcher graphs the flight of Bird B. And two more researchers represent the flight of Birds C as a function $f(x)$ and Bird D as an equation.
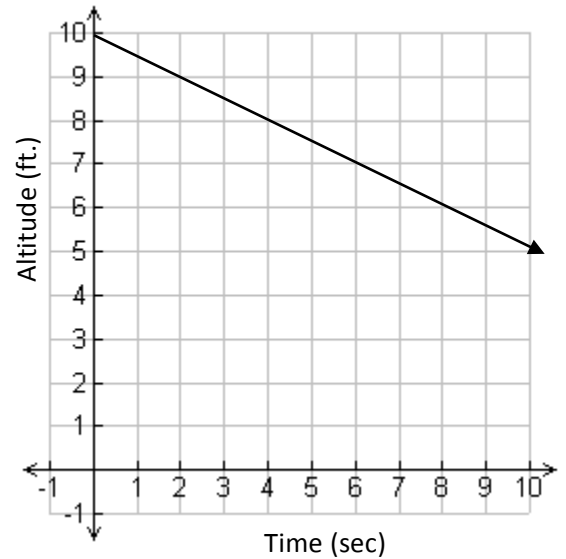
Bird A: ROC _____

Altitude (ft)	10	15	20	25	30
Time (sec)	0	2	4	6	8

Bird B: ROC _____

Bird C: ROC _____

$$f(x) = -3x + 10$$

Bird D: ROC _____

$$-3x + 2y = 20$$

Step A: Which bird's altitude is changing the fastest? Justify your answer.

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Step B: Which bird will be at the highest altitude after 10 seconds?

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CFS:　　2
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Partner Practice: *(Low Difficulty)*

1. Given the equations or functions below, identify the rate of change for each.

a. $f(x) = 8x + 2$	b. $g(x) = -4x - 1$	c. $h(x) = x$	d. $j(x) = 3(-2x + 5)$
e. $2x + y = -1$		f. $-x + 2y = 2$	g. $-8x - 4y = -2$

2. Which of the equations or functions in question 1 has output values that are changing the fastest? Slowest? Justify your answers.

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Partner Practice: *(Medium Difficulty)*

3. What are the units of the rate of change for the functions and which function is changing the fastest? Explain your answer.

$$g(x) = -10(9x - 100)$$

$f(x)$ = feet	-380	-570	-855	-950	-1140
x = seconds	4	6	9	10	12

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4. Which function will produce the shallower line when graphed? Justify and prove your answer is correct by graphing to check.

$$2x + 3y = 3 \qquad\qquad y = \frac{1}{5}(3x - 15)$$

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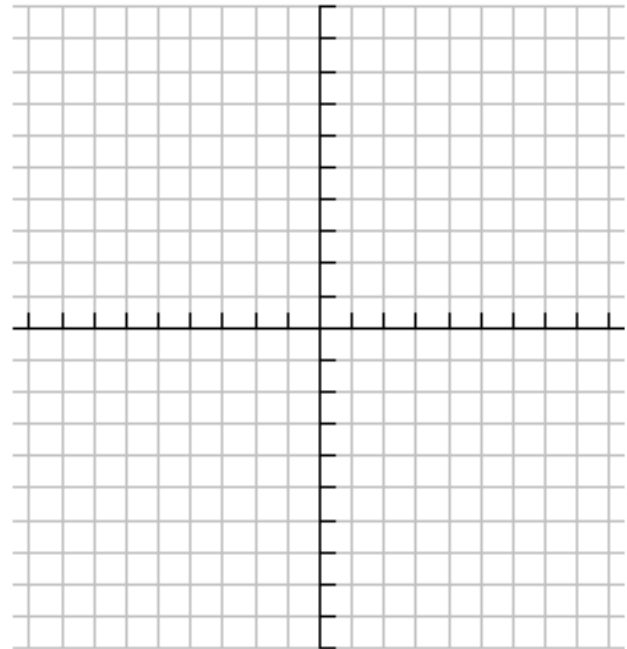
5. Marco and Mindy are comparing the amount of time it takes them to run a sprint in track and field events and decide to race each other.

     ○ Marco writes the function $f(t) = 9.5t$ to describe how far he can run in feet, $f(t)$, after t seconds.

     ○ Mindy gets a head start of 20 feet and uses an equation to determine her distance, y, after x seconds $-15x + 2y = 40$.

     Step A: Without solving anything, what will the units of the rate of change be and what will it describe?

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CFS: 4
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Step B: Who is the faster runner? Justify your answer.

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Step C: Who will be further ahead after 4 second? Show all of your work to support your answer.

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Step D: Who will win the race if they are running 100 feet? Show all of your work to support your answer.

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Step E: Describe the difference in the three quantities that were determined in Steps B, C, and D.

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Partner Practice: *(Hard Difficulty)*

6. Order the functions from steepest to shallowest according to what their graph would look like.

a. $f(x) = 5.25x + 1$	b. $g(x) = 3.5(-1.5x - 4)$
c. $10x - 3y = 2$	d. $3(4x + 1.5y) = 11$

CFS: 5
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7. Given equation $2x + 4y = 8$, algebraically determine where the graph of the line will pass through the y-axis and the x-axis.

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