

Unit 1H: Linearity REVIEW Study Guide Name: _____ Per: _____
 SHOW YOUR WORK FOR FULL CREDIT. NO WORK, NO CREDIT. NO WORK IN PEN.

Assn	Learning Objective	A Day	B Day	Done
1.1	Class Procedures & Pre-Assessment & Linearity Review	Aug-20	Aug-21	
1.2	Train Tracks	Aug-22	Aug-23	
	Unit 1 Linearity EMT & Study Guide Due	Aug-24	Aug-27	
2B4A	(give 2B4A review for solving equations)	Aug-24	Aug-27	

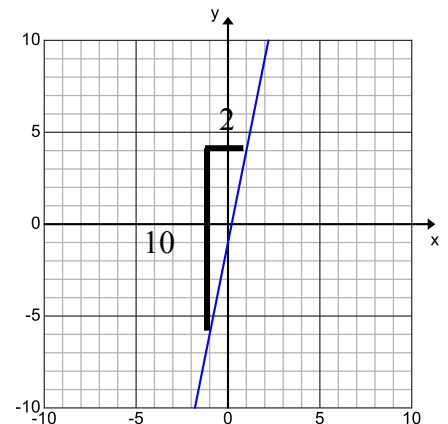
Targets	Sample Question	Ugh	Okay	Master
Compare slopes and intercepts from a combination of equations, graphs, and or tables.	Determine the slope and intercepts from the following equation, graph and or table. Describe and compare. Explain.			
Write equations from story problems in slope-intercept form.	An electrician charges a \$25 consultation fee plus \$35 per hour for labor. Write an equation in slope-intercept form for the total cost of a job that takes h hours.			
Understand parts of slope-intercept equations	Write an equation in slope-intercept form: a) Given slope and y-intercept b) Given two points c) Given slope and a point			
Write an equation for parallel lines through a given point.	Write an equation for a line parallel to $y = 4x + 3$ containing the point $(-3, 6)$			
Write an equation for a perpendicular line through a given point.	Write an equation for a line perpendicular to $y = -\frac{3}{4}x + 2$ that contains the point $(4, 0)$			

Vocabulary and Terms:

Slope: _____
 Slope-Intercept Form: $y =$ _____ m is _____ b is _____
 y and x makes the _____ point $(x, \text{_____})$
 To be in slope-intercept form, "**y**" **must be isolated** and with a coefficient equal to _____
 Y-Intercept: where x equals _____ and crosses _____. Written as $(\text{____}, b)$
 X-Intercept: where y equals _____ and crosses _____. Written as $(-\frac{b}{m}, \text{_____})$
 Describe the Slopes of Parallel Lines: _____
 Describe the Slopes of Perpendicular Lines: _____
 The headings of a 4-Column Tables are _____
 Dependent Variable: _____
 Independent Variable: _____
 A scale on a coordinate grid must be _____

Write an Equation of a Line from a Graph

- Find the slope (m), $\frac{\text{rise}}{\text{run}} =$ _____
- Find the y-intercept, (where $x = 0$). _____ (Write as a point.)
- Use the equation $y = mx + b$ and replace slope with m and b with the y-intercept. Equation is _____
- If the y-intercept is not an integer coordinate, find an integer point on the graph and use the slope and $y = mx + b$ to find the y-intercept.



4-Column Tables

Four-column tables reveal the pattern in an algebraic sequence. Headings are Input, Pattern, Output, Short Hand. Starting inputs at zero for linear patterns reveals the $y = mx + b$ form of a linear equation. For the graph on the last page,

X	Pattern	Y	Short Hand
0	-1	-1	$-1 + 5(0)$
1	$-1 + 5$	4	$-1 + 5(1)$
2	$-1 + 5 + 5$	9	$-1 + 5(2)$
X	?	Y	$-1 + 5(X)$

Make a 4-column table of the above starting with an input of 2. (Do not go back to $x = 0$.)

What happens to your equation? _____

How can you fix the equation so that the data stays correct but the table STILL DOES NOT START AT 0?

What is your new equation? _____ How could you prove that this equation also works?

EC. Recognizing this adjustment, what would be the equation given a slope of 3 and a point (4, -7)?

Write the Equation of a Line from a Table

	x	y	
2	2	9	10
1	4	19	5
	5	24	

Using equation: $y = mx + b$
 Choose a point from the table to replace for x and y
 $\underline{\quad} = m(\underline{\quad}) + b$
 Use the value of slope for m and solve for b.
 $\underline{\quad} = (\underline{\quad})(\underline{\quad}) + b$
 $\underline{\quad} = b$

- Find the slope (m), $\frac{\text{change in } y}{\text{change in } x} = \underline{\quad}$ or $\underline{\quad}$
- Find the y-intercept (b), (where $x = 0$). Write it as a coordinate point (0, $\underline{\quad}$)
- Extend the table to find the y intercept.
- Use the equation to find the y-intercept in the box to the right.
- Insert the slope and y-intercept into the form $y = mx + b$
- Equation is _____

Find Slope-Intercept Equations Given Two Points

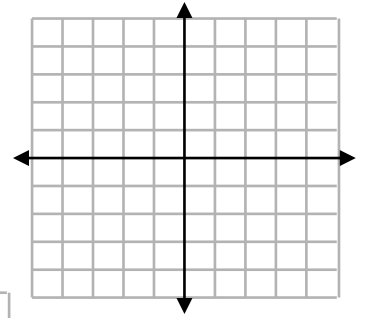
- Given the points (2, 6) and (-4, 9), find the slope. _____
- Show to the right how to find the y-intercepts as in the box above. Y-intercept _____ (Write as a coordinate.)
- Insert into $y = mx + b$. Equation is _____

Find Slope-Intercept Equations Given the Slope and a Point

- Given the slope of 3 and the point (2, 6), find the y-intercepts as in the box above.
 Y-intercept _____ (Write as a coordinate.)
- Insert into $y = mx + b$. Equation is _____

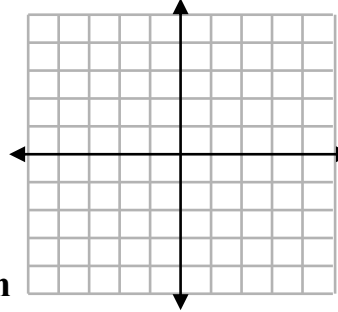
Graph and find the Equation of a Line Given 1 Point and the Slope

- Given the point (2, 3) and a Slope of $-\frac{1}{3}$, plot the point.
- The numerator is the Rise; the denominator is the Run. Draw the slope.
- Find the y-intercept where $x = 0$. The equation of the line is



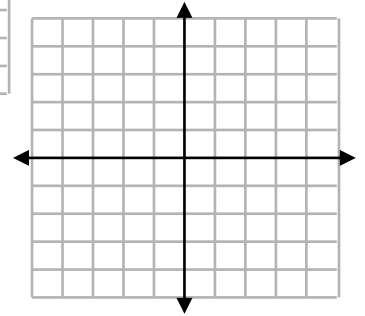
Graph and find the Equation of a Line Given 2 Points.

- Given the points (-2, 5) and (3, -5), plot the points.
- Find the slope. _____
- Find the y-intercept: _____
- Write the equation: _____



Graph and find the Equation of a Line Given an Equation.

- Given the equation $y = -3x + 2$, find the y-intercept _____
- Plot the slope. (See above.) Label this as line A.



OR

- Given the equation $4x + 5y = 20$, find the y-intercept (where $x = 0$). _____
- Find the x-intercept (where $y = 0$). _____
- Plot the intercepts and connect the points. Label this line B.

List x-intercept: _____ y-intercept: _____

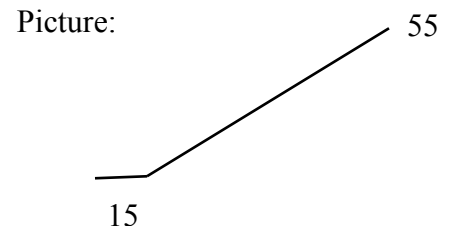
Write the Slope/Intercept Equation from a Story Problem

- Cross out unnecessary information.
- Draw a picture to **SEE** the math.
- Define your variables. Be VERY _____.
- Continue using the methods above.

Example: ~~You supervise the construction of a roller coaster for young children.~~ The platform to board the ride is 15 feet off the ground. Twenty feet up the track the car will be 55 feet off the ground. Write the equation of the path of the roller coaster for the first part of the ride.

X	Y

Variables:
 Independent variable: "Distance down track"
 Dependent variable: "Height of the track"
 Rate of Change is: _____
 The y-intercept is: (0,), because



The equation is: _____

You solve: The snowiest day in the city of Bitterton ended with 128 inches of snow on the ground. When the storm started, there were 8 inches already on the ground. It snowed for a total of 6 hours. Write the equation that represents the number of inches that fell per hour.

Draw a picture:

Define your variables:

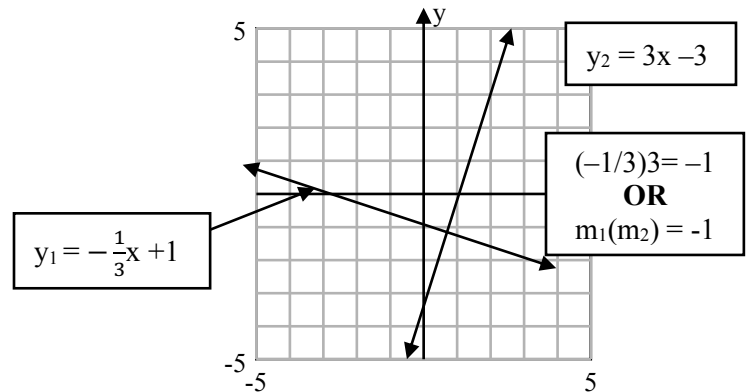
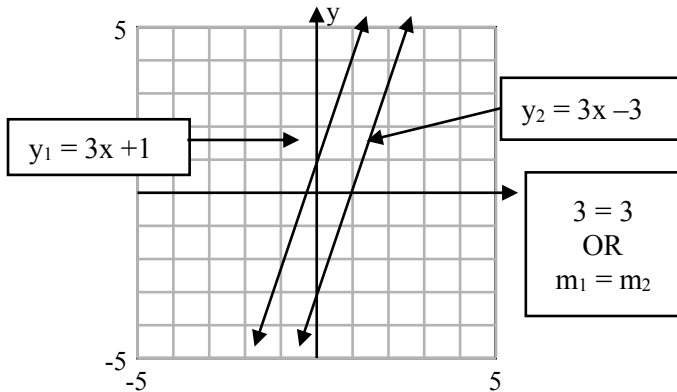
Use a 4-column table and then a 2-column table:

Find the slope: _____ The y-intercept: _____ The equation: _____

Parallel and Perpendicular Lines

Parallel Lines have slopes that are equal. (They always go in the same direction.)

Perpendicular Lines have slopes that are negative reciprocals (multiply to equal -1). They move in exact opposite directions at 90 degrees.



Find the slopes and CIRCLE whether the lines are parallel, perpendicular, or neither.

- | | | |
|---|--|---|
| a) $y - 4x = 5$ $m = \underline{\hspace{1cm}}$ | b) $y = 4x - 3$ $m = \underline{\hspace{1cm}}$ | c) $y = -\frac{3}{6}x - 6$ $m = \underline{\hspace{1cm}}$ |
| $y = \frac{8}{2}(x + 5)$ $m = \underline{\hspace{1cm}}$ | $y + 4 = -\frac{1}{4}x + 1$ $m = \underline{\hspace{1cm}}$ | $y - 3 = 2(x + 4)$ $m = \underline{\hspace{1cm}}$ |
| Parallel/Perpendicular/Neither | Parallel/Perpendicular/Neither | Parallel/Perpendicular/Neither |

Find the equations that are parallel and perpendicular to the line that passes through a given point.

Example: $y = 2x - 5$, point $(3, -1)$

PARALLEL: slopes will be the same

- Start with $y = 2x + b$, and insert point
 $-1 = 2(3) + b$, so $b = -7$
- Write the equation with slope and y-intercept.
 $y = 2x - 7$

a) $y = \frac{1}{5}x - 2$, point $(-5, -1)$

PARALLEL:

b) $y = 3x + 1$, point $(-3, 4)$

PARALLEL:

PERPENDICULAR: slopes will be negative reciprocals, so $m = -\frac{1}{2}$

- Start with $y = -\frac{1}{2}x + b$, and insert point
 $-1 = -\frac{1}{2}(3) + b$, so $b = \frac{1}{2}$
- Write the equation with slope and y-intercept.
 $y = -\frac{1}{2}x + \frac{1}{2}$

PERPENDICULAR:

PERPENDICULAR: