Name: ______________________________

MATH 8: UNIT 2: REPRESENTING LINEAR FUNCTIONS

Students will define slope as measurable rate of change, and suggest possible real-world applications. Students will understand a linear function shown as a table, graph, and algebra equation. *Linear function* is like the data of

- How much money you make for any amount of time worked while earning $25/hour.
- How far you travel walking if your average speed is 5 mph.
- How much it costs to go to the movies with family/friends if each ticket is $8.

Useful text: Chapter 5: Linear Functions, pages 253 - 324

Section 1: Recognizing a *function*. Function means each input (x value) only has one output (y value). This is easiest by making a graph and using the vertical line test. If any vertical line (straight up/down) intersects the graph in 2+ places, that relationship is not a function.
Section 2: Creating a table, graph, and equation with data of a *linear function*, and recognizing a *linear function*. A linear function graphs as a straight line in the form of $y = mx + b$. The variable m is the *slope*, and b is the *y-intercept* point. *Slope* means how steep the line is measured as rise (change in y from one point to another) over run (change in x from those same two points). *Y-intercept* means where the graphed line crosses the y-axis; that is, what y equals when $x = 0$, or what y equals at the beginning of a story if x measures time.
Section 3: Use a linear equation ($y = mx + b$) to test if a set of points belong to the equation or not, and to graph a linear equation.

****

Section 1: Recognizing a *function*.

a. A function has one y-value (output) for each x-value (input). This is most easily recognized by making a simple graph to discover if any vertical (up/down) line passes through the graph at any place in 2+ times. If it does, the graphed relationship is not a function. We'll practice!

Section 2: Creating a table, graph, and equation with data of a *linear function*, and recognizing a *linear function*.

a. We'll take a story with data that fits a linear function, similar to how much money you'd have if you begin with $50, and then earn $15/hour. We'll represent this data on a table.

b. We'll take the same story, and represent the data on a graph you'll create. In this case, money would be measured on the y-axis, and time (hours) on the x-axis. You'll have to create numbers of measurement on the y and x lines that make sense to show a good picture/graph of the data.

c. Same story with data that we'll put into equation form of $y = mx + b$. The variable m is the *slope*, and b is the *y-intercept* point. In our example, the slope (rate of change) is $15 each hour, and the y-intercept (what happens at the start of our story at time = 0) is $50.

d. Same data story, and we look into the future! For example, if you wanted to buy a PS4 for $400, how many total hours would you have to work?

e. Next, we'll reverse this to give you a graph, table, and equation, then ask you to identify the slope (rate of change) and something like, "Given three students working, who will earn the $400 for the PS4 first?"

f. Finally, we'll give you graphs, equations, and tables and ask if it shows a linear function or non-linear function. A linear function will always have a straight line (that's why they call it linear).

Section 3: Use a linear equation ($y = mx + b$) to test if a set of points belong to the equation or not, and to graph a linear equation.

a. We'll start with a linear equation, like y = -3x + 2. You'll have sets of points and have to check if the points belong on that linear function or not. For this example, we could ask if the (x, y) point (1, -1) is a solution (on the line).

b. You'll take points that belong on the linear function, and graph them. In this case, because the point (1, -1) is on the graph, you would graph and label that as one of the points on the graph.