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Unit 3B - Functions Study Guide

Learning Target:
8.F.1 - I can explain that a function represents a relationship in which each input has exactly one output and the output depends on the input.

Notes and Resources:
Remember the mapping method and vertical line test!
Tables & Ordered Pairs - IF no repeating x-values it is a function.
Graph - vertical line test if vertical only passes through graph once it is a function.
mapping - IF each x-value has ~~one~~ one arrow, it is a function.

1.) Determine if the following represent a function:
(0,2) (4,2) (6,6) (8,8) Not a function

Learning Target:
8.F.2 I can compare properties of two functions each represented in a different way:

Notes and Resources:
linear equation $\rightarrow y = mx + b$
rate of change (slope)

Function A: Alex goes to the fair. He pays \$10 for admission and \$3.50 per game.
Function B: $y = 2x + 3$
Function C: $y = 10x + 5$

Algebraically- equation

For table and graph find rise over run.

Function C because 10 is larger than 3.50 and $\frac{3}{2}$

Numerically- table

In word descriptions, look for words like "per", "each", "every", etc...

Function A: Alex goes to the fair. He pays \$10 for admission and \$3.50 per game.

Graphically- graph

Does the pattern rise by a constant (same) amount?
Does it run by a constant (same) amount?

Function B: $y = 2x + 3$

Verbal- description with words

Notes and Resources: <http://stricklenwms.weebly.com/8f3-examples-of-functions.html>
<http://www.ixl.com/math/grade-8/identify-linear-and-nonlinear-functions>

Function C: $y = 10x + 5$

Learning Target:
8.F.3 A I can analyze the rate of change between the input, output values to determine if a function is linear or non linear.

Tell whether the relationship is Linear, Exponential or Neither. Explain your reasoning.

Function A: Alex goes to the fair. He pays \$10 for admission and \$3.50 per game.

Does the pattern rise by a constant (same) amount?
Does it run by a constant (same) amount?

CONSTANT! Rate of Change - Linear

Not a constant rate of change - Non-linear (Exponential - x^2)

Not a constant rate of change -

0	1	2	3	4	5	6	7	8
10	12.5	15	17.5	20	22.5	25	27.5	30

Rate of Change =

8.F3 B I can give examples of relationships that are non linear functions.

If the equation is not in $y=mx+b$ form (or cannot be put into this form it is non-linear)
 Exponents are big hints of non-linear equations
 make a table if needed!

Notes and Resources:

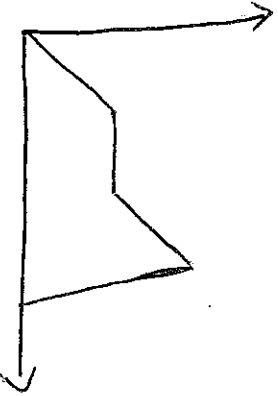
$y = \frac{1}{\text{rate of change}} x + \frac{\text{y-intercept}}{\text{rate of change}}$

Linear relationships should make straight lines!
 Begin with y-intercept in table.

Notes and Resources:

(A) Sally leaves a party and walks a long route to the gas station, when she realizes she has no money. She leaves and goes to two banks, which were closed.
 (B) As the sun rises in the morning the temp. begins to increase. It stays the same for a short period, then increases again into the afternoon.

Notes and Resources:



Classifying Equations as Linear or Non Linear

$y=x^2$ Non-linear (exponent)

$y=x^3-5$ Non-linear (exponents)

$y=2x+3$ Linear ($y=mx+b$ form)

Bonus:

1. Quadratic functions are non-linear (T or F)

2. Exponential functions are linear (T or F)

3. $y=3$ is a nonlinear function (T or F)

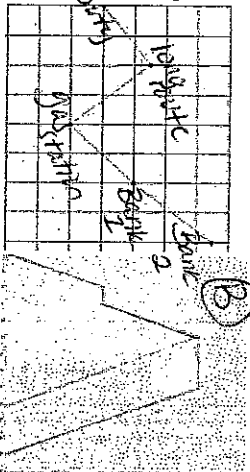
Given a real world situation be able to write a linear equation, create a table and graph.

Example: Ken's Canoe Rental charges \$10 per person when renting a canoe but has a \$20 rental fee per trip

$y = 10x + 20$

$$\begin{array}{r} 10x + 20 \\ 130 \\ \hline 240 \end{array}$$

Piecewise - write a story based on a given graph



IF STAY the same until stopped

Draw a graph a table based on a given story. Sarah left her house for a walk at a constant rate. She met a friend along the way so she stopped and talked for a while, she began walking again at the same constant rate and then realized she needed to get back home so she turned around and ran back to her house.