NAME:_____ Math _____ , Period _____

Mr. Rogove Date:_____

LEARNING OBJECTIVE: we will compare the properties of linear functions in different ways. (G8M5L6)

CONCEPT DEVELOPMENT:

Functions: A function is a rule that assigns each input exactly one output.
Stated another way: no x-values are repeated.

Linear Functions: A function where the rule is specifically a linear equation in the form $y = mx + b$.

Functions can be viewed represented four ways

Verbally/Written Description

I have $500 in my bank account now, and deposit $75 per week.

Equation

(Weekly deposit) rate of change; starting amount

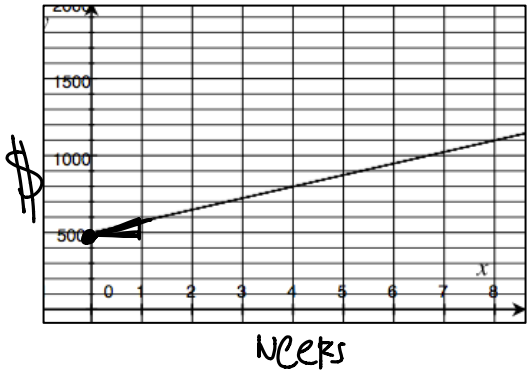
$y = 75x + 500$ **or**
$f(x) = 75x + 500$

Table

Weeks *(x)*	Money *(y)*
0	500
1	575
2	650
3	725
5	875

+1, +75

Graph



All of the 4 representations above describe the same function, where the amount of money in my bank account IS A FUNCTION of the number of weeks that have passed by.

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Guided Practice:

Steps to Comparing Linear Functions

1. Read the scenario carefully, study any tables/graphs, and highlight the important information.
2. Identify the rate for each function.
3. Re-read the scenario and answer the question asked.

Mason and Julia drive separate cars at a constant speed. They both drive the same route from San Jose to San Luis Obispo, a distance of 147 miles. Mason begins at 1:40PM and arrives in San Luis Obispo at 4:15PM. Julia's trip can be described by the equation $f(x) = 64x$, where the distance she travels is a function of how many hours she drives for. Who gets to San Luis Obispo faster?

$64 \times 2.5 = 160$ In $2\frac{1}{2}$ hrs, Julia goes 160 miles

In 2:35, Masm goes 147

$2:35 = 2\frac{7}{12}$

$\frac{147}{\frac{31}{12}} = \frac{1764}{31} = 56.9$ MPH

$F(x) = 56.9x < f(x) = 64x$ Julia goes 7.1 MPH fast

Rayan is researching cell phone plans. Sprint charges a flat rate of $75 each month. This means that he would pay $75 with no additional costs. The charge for T-Mobile is a function of the number of texts you send that month—the amount he pays will change each month based on how many texts he sends that month. The table below represents the inputs and corresponding output that the function assigns

Input (number of texts)	Output (cost of bill)
50	$50
150 (+100)	$60 (+10)
200 (+50)	$65 (+5)
500 (+300)	$95 (+30)

When does it become cheaper for Rayan to go with Sprint v. T-Mobile?

$S(x) = 75$ $75 = T(x)$

$T(x) = 0.1x + 45$

T-Mobile texts cost $0.10, and $45 flat rate.

After 300 texts, use Sprint. Up to 300 texts use T-Mobile

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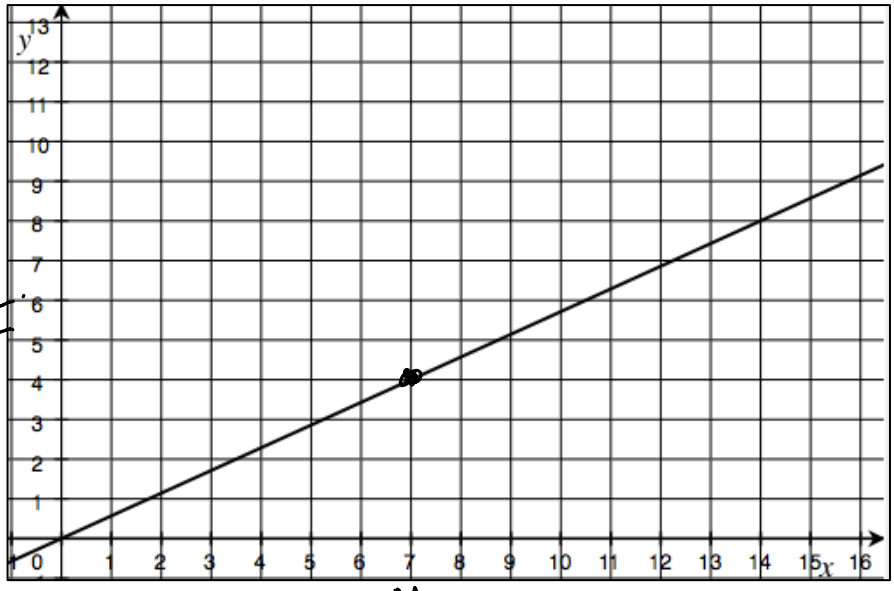
A function describes the volume of water in gallons, y, that flows from faucet A for x minutes. The graph below is the graph of this function. Faucet B's water flow can be described by the equation $y = \frac{5}{6}x$, where y is the volume of water in gallons that flows from the faucet in x minutes. Assume the water flow is constant.



GAL.

MINUTES

Which faucet has a faster flow?

✓ FAUCET B = $B(x) = \frac{5}{6}x$ ✓

FAUCET A = $A(x) = \frac{4}{7}x$

Each faucet is being used to fill 50 gallon tubs. How long will it take each faucet to fill the tub? How do you know?

$\frac{6}{5}\left(\frac{5}{6}x = 50\right)\frac{6}{5}$ B

$x = 1$ hr.

$\frac{7}{4}\left(\frac{4}{7}x = 50\right)$ A

$x = \frac{350}{4} = 87$ min. 30 sec.

Suppose the tub that is being filled by faucet A already has 15 gallons in it. If both faucets are turned on at the same time, which tub will be full first?

$\frac{7}{4}\left(\frac{4}{7}x = 35\right)\frac{7}{4}$

$x = \frac{245}{4} = 61.25$ 61 min. 15 sec.

Tub B by 75 seconds

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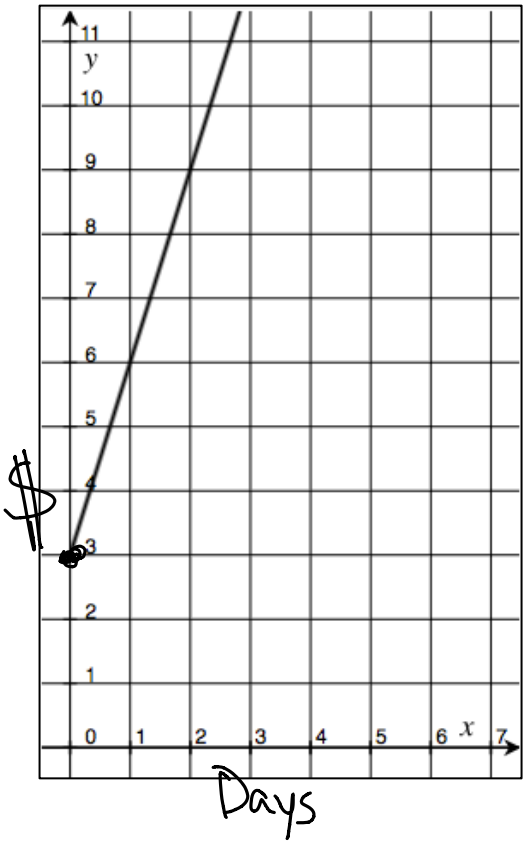
Two people, Adam and Bianca, are competing to see who can save the most money in one month. Use the table and the graph below to determine who will save more money at the end of the month.

Adam's Savings



Bianca's Savings

Input (number of days)	Output (total amount of money)
5	$17
8	$26
12	$38
20	$62

Slope = 3

State how much money each person had at the start of the competition.

Adam → $3.00

Bianca → $2.00

Who had more money at the end of the month?

Adam had $1 more than Bianca at the end of the month.

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Independent Practice:

Give problem set for Lesson 7 as independent practice.

Activating Prior Knowledge:

$2(x+5)=3(x+6)$	$-(4x+1)=3(2x-1)$	$15x-12=9x-6$
$3(x+5)=4(x+6)$	$3(4x+1)=-(2x-1)$	$\frac{1}{3}(15x-12)=9x-6$
$4(x+5)=5(x+6)$	$-3(4x+1)=2x-1$	$\frac{2}{3}(15x-12)=9x-6$

Closure:

What can you look for in descriptions of functions to determine if they are linear or not? Be specific in the type of description (i.e. table, graph, story, equation). What are you looking for in each of these instances?

Teacher Notes:

Map to Lesson 7, Mod 5.