COMPARING LINEAR FUNCTIONS

Unit 3
Lesson 7

Essential Question: How can you determine the steepness of a linear function if it's not graphed? Answer on your response card.

Example 1- Use Equation A and Table B below to complete the problem:

a. Find the rate of change for each. "slope" ✓

b. Find the y-intercept for each. ✓

c. Which one has the greatest rate of change? Table B steeper

d. If $x = 10$, which one has the greatest y?

Eq A: $y = \frac{5}{2}(10) - 3$, $y = 22$

Table B: $y = 4(10) - 3$, $y = 37$, Greater

e. What does x need to be to make $y = 17$ for each one?

Eq A: $17 = \frac{5}{2}x - 3$, $+3$ $+3$, $2(20 = \frac{5}{2}x)$, $\frac{40}{5} = \frac{5x}{5}$, $8 = x$

Table B: $17 = 4x - 3$, $+3$ $+3$, $\frac{20}{4} = \frac{4x}{4}$, $5 = x$

Equation A: $y = \frac{5}{2}x - 3$, $m = \frac{5}{2} = 2.5$, $b = -3$

Table B:

x	-1	0	1	2	3
y	-7	-3	1	5	9

(y-int ($x=0$))

$(-1, -7)(0, -3)$ $y = 4x - 3$

$m = \frac{-3-(-7)}{0-(-1)} = \frac{4}{1}$ $m = 4$ $b = -3$

Example 2- Find the rate of change for each function represented below. Then order the rates from least to greatest.

Function A Convert to $y = mx + b$

$3x - y = 2$

$-1(-y = -3x + 2)$ $-3x$ $-3x$

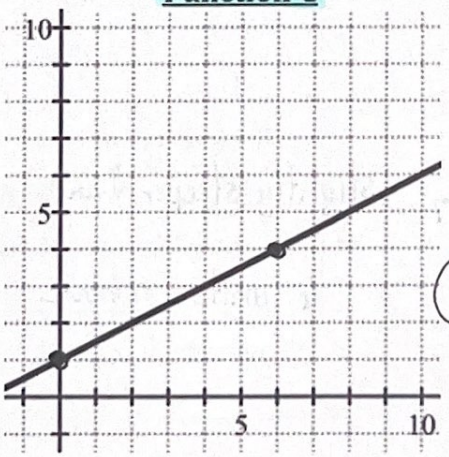
$y = 3x - 2$, $m = 3$

Function B HOY VUX

$y = 1$

$m = 0$

Function C



$m = \frac{\text{rise}}{\text{run}}$, $m = \frac{1}{2}$

Function D

x	y
1	$\frac{4}{3}$
3	2
5	$\frac{8}{3}$
6	3

$m = \frac{y_2 - y_1}{x_2 - x_1}$

$m = \frac{3-2}{6-3} = \frac{1}{3}$

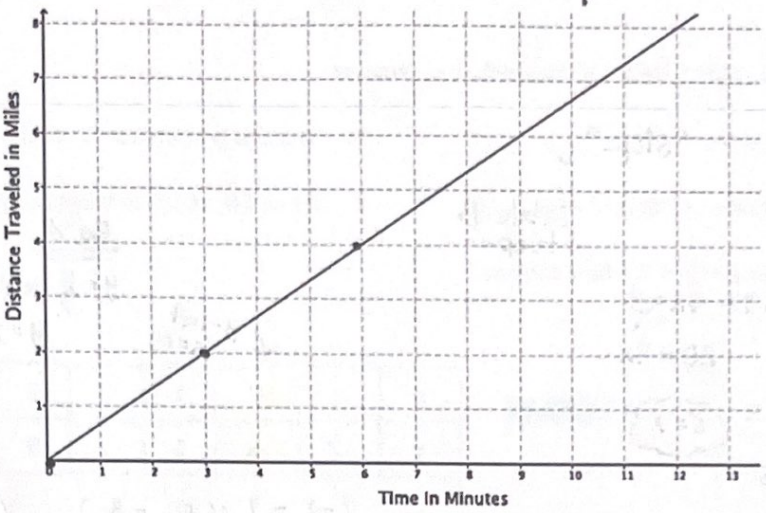
Least 0, $\frac{1}{3}$, $\frac{1}{2}$, 3 Greatest

Flattest Steepest

The graph below represents the distance, y, Car A travels in x minutes. The table represents the distance, y, Car B travels in x minutes. **Which car is traveling at a greater speed?** How do you know?

Car A:

↖ Find slope.



$m = \frac{2 \text{ miles}}{3 \text{ min.}}$

$\approx .66$

Car B:

Time in minutes (x)	Distance (y)
15	12.5
30	25
45	37.5

$m = \frac{25 - 12.5}{30 - 15}$

$m = \frac{12.5}{15}$

$m = \frac{5}{6}$ miles per min $\approx .83$

Car B is faster, because it has a greater slope.

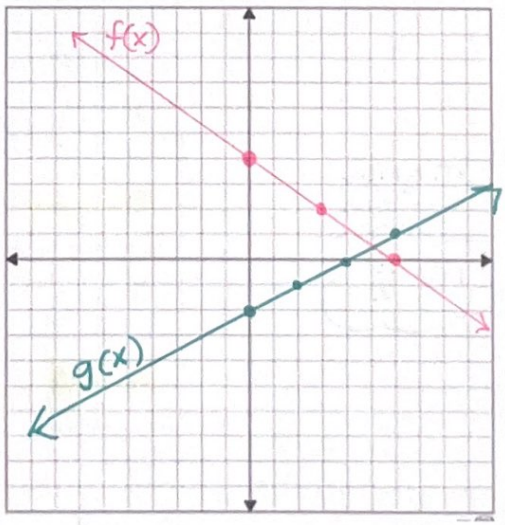
By graphing two functions together, we can **more easily compare their characteristics**. Graph the following and complete the sentence.

$f(x) = -\frac{2}{3}x + 4$

$m = \frac{-2 \downarrow}{3 \rightarrow}$ $b = 4$

$g(x) = \frac{1}{2}x - 2$

$m = \frac{1 \uparrow}{2 \rightarrow}$ $b = -2$



The graph of $f(x)$ is slightly steeper than the graph of $g(x)$. The y-intercept of $f(x)$ is 6 units above the y-intercept of $g(x)$.