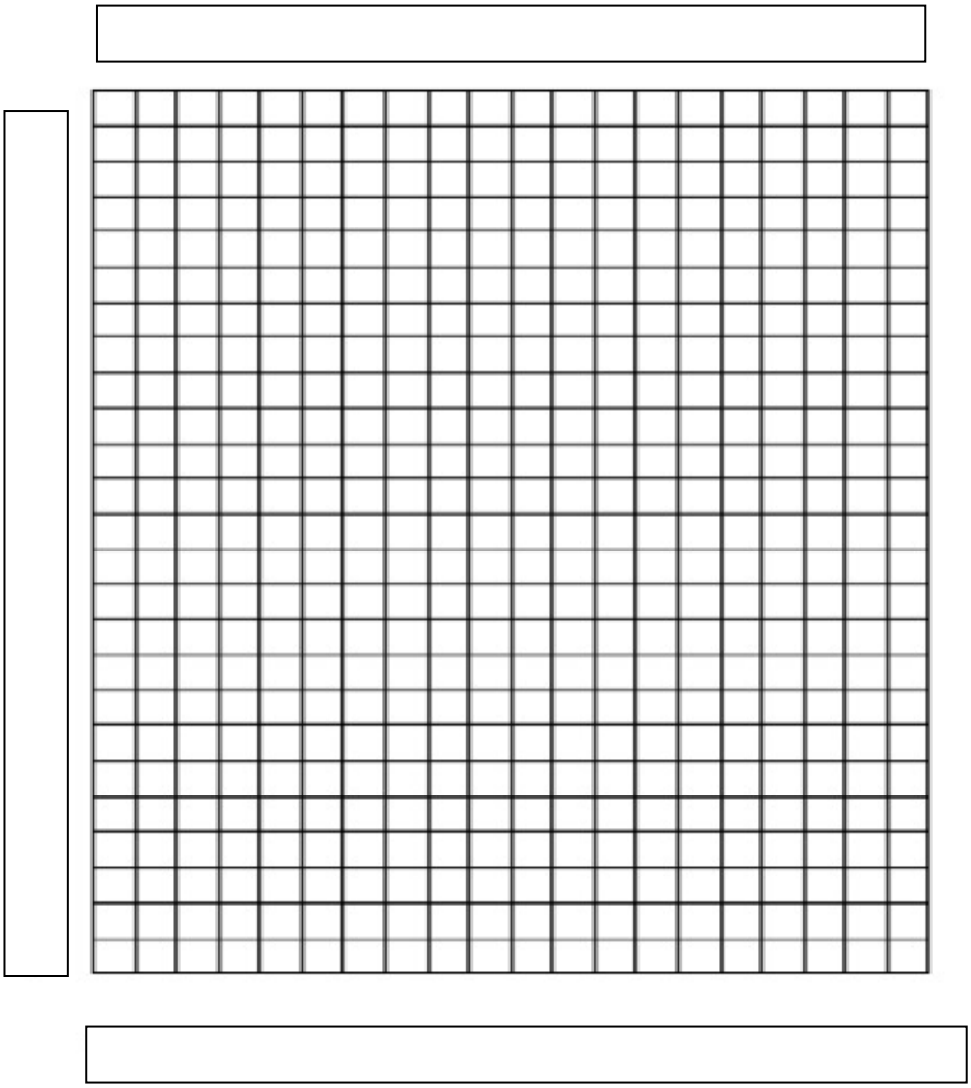
MiSP Speed Worksheet #2 L3

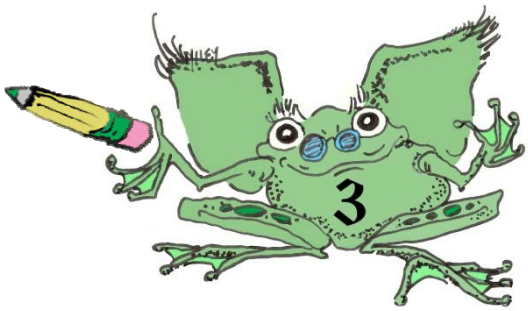
Name: _____ Date:_____

Cars

Yesterday you calculated the speed at which three characters from the movie *Cars could travel. Today you will graph the data.*

Directions: Use the data for each of the cars to graph the relationship between time and distance. The relationships will all be linear**.**





Analysis:

Fillmore:

1. Use the formula below to find the slope of the line.

Slope of a line = $\frac{\Delta y}{\Delta x}$ or Slope of a line = $\frac{(y_2 - y_1)}{(x_2 - x_1)}$

a. Calculate the slope of the Fillmore line:

(20, 20) and (40, 40)
(x_1, y_1) (x_2, y_2)

Slope of a line = $\frac{(y_2 - y_1)}{(x_2 - x_1)}$ =

b. What else does the slope represent? _____

Lightning McQueen:

1. Calculate the slope of the line for Lightning McQueen, using any points you would like.

(,) and (,)
(x_1, y_1) (x_2, y_2)

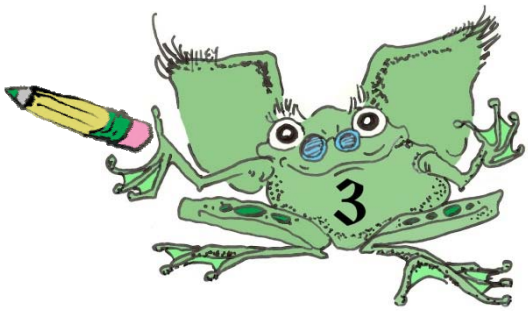
2. Calculate the slope, using the appropriate formula and showing all of your work:

Formula:

Slope of a line = (-) / (-)

Slope =

Luigi:



1. Predict what the slope of the line is for Luigi. _____

2. Choose two ordered pairs on the Luigi line:

   (____, ____) (____, ____)

3. Calculate, using the appropriate formula:

Formula:

Slope of a line = $\frac{(\quad - \quad)}{(\quad - \quad)}$

Slope =

4. Was your prediction correct? _____

Record your data here:

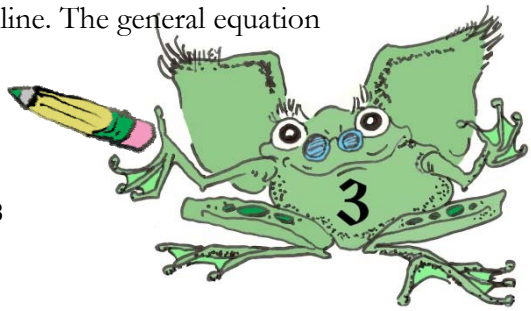
Car	Time	Distance	Speed	Slope
Fillmore				
Lightning McQueen				
Luigi				

1. What is the relationship between slope and speed?

   _____

   _____

2. For any linear relationship, an equation can be written for that line. The general equation for a line is



$$y = mx + b$$

- The *m* in the equation stands for the slope.
  Looking at the Fillmore line, what is the slope?_____

Therefore, *m* = _____

- The *b* in this equation stands for the *y*-intercept. This is where the line passes through the *y*-axis.

When **Fillmore** is at 0 seconds, what is the distance? _____. This is the *y*-intercept.

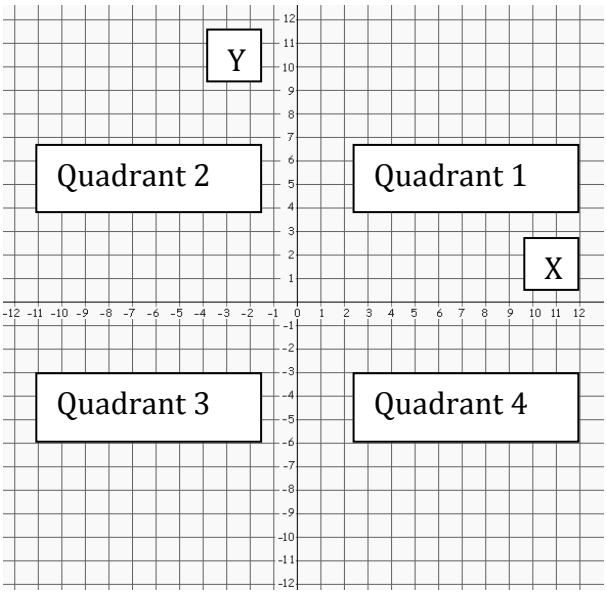
Therefore, *b* = _____.

Now, look at all three lines. What do you notice about their *y*-intercepts?

_____

What is the *y*-intercept for **Lightning McQueen**? _____

What is the *y*-intercept for **Luigi**? _____

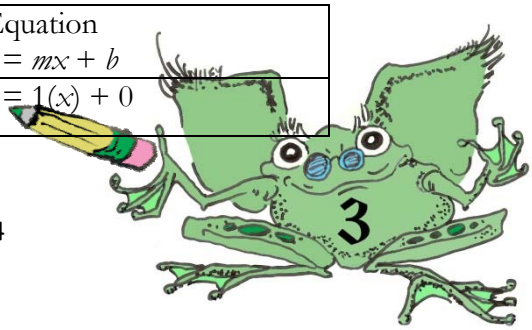


Each of these lines passes through (0, 0), so the *y*-intercept is always 0 for each of these lines.

Since we are measuring only positive distances and positive times, this entire line graph is in quadrant ___. It is impossible for the car to travel any distance in 0 seconds; therefore, the *y*-intercept is always 0.

Now you can write an equation for each line:

Car	Slope (m)	y-intercept (b)	Equation $y = mx + b$
Fillmore	1	0	$y = 1(x) + 0$



Lightning McQueen			$y =$
Luigi			$y =$

Use the equation for the Lightning McQueen line to gather information about x and y.

x Time (min)	y Distance (km)
0	0
10	
25	
60	

Show your work:

$y = 2(x) + 0$ $y = 2(0) + 0$ $y = 0$	$y = 2(x) + 0$ $y = 2(10) + 0$ $y =$		

Conclusion Question:

What is the equation for a line? _____

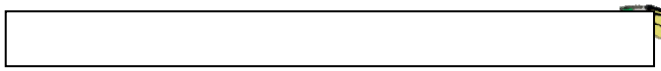
What does the m stand for? _____

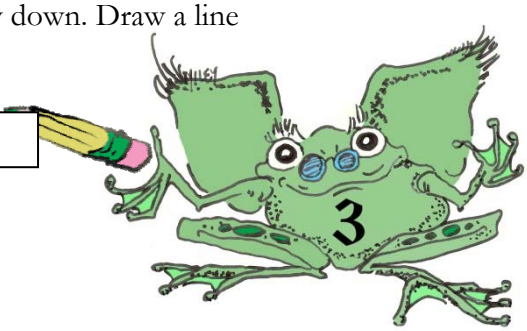
What does the b stand for? _____

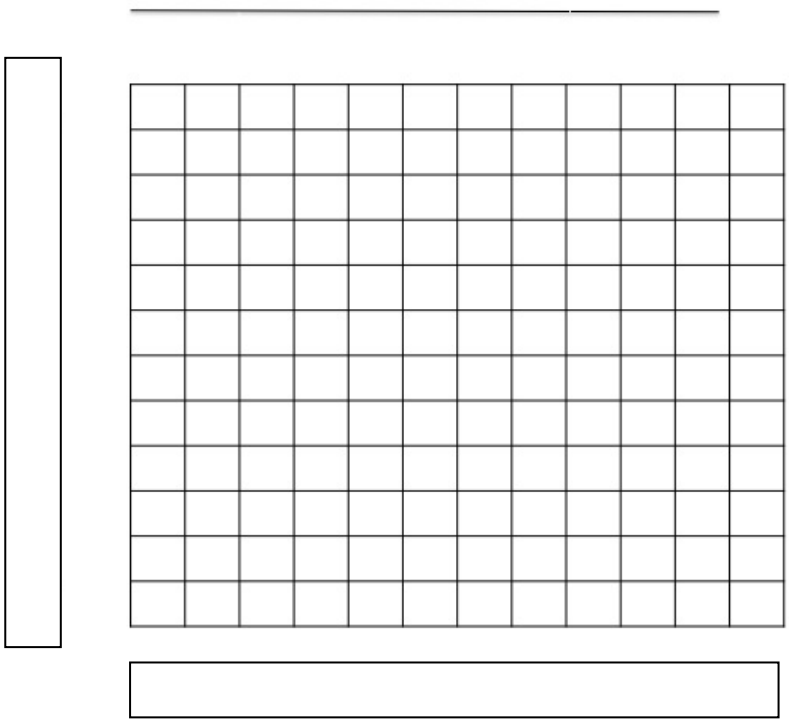
What can this equation be used for? _____

Extensions:

1. Predict what the graph would look like if Fillmore were to speed up. Draw a line representing your prediction on the graph below.
2. Predict what the graph would look like if Fillmore were to slow down. Draw a line representing your prediction on the graph below.





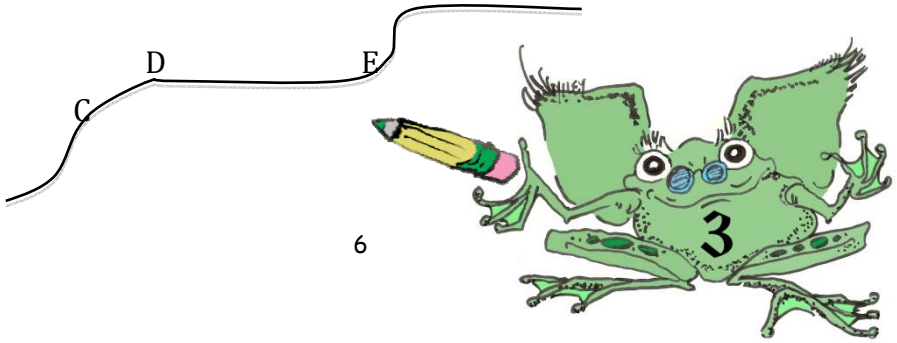


3. When you are riding in the car, do you think that you are always traveling at a constant speed? Explain your answer.

_____

_____

4. Look at the graph of the following car trip.



Is this car traveling at a constant speed? _____ How do you know?

_____

_____

5. Circle sections of the graph where the car is accelerating. _____

6. What is the car doing between D and E? _____

7. Explain how you find the car's average speed on this trip.

_____

_____