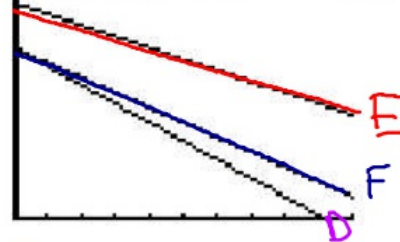


5. The diagram below shows graphs of account balance functions for three Electric Avenue customers.

Emily: $E = 580 - 30m$

Darryl: $D = 460 - 50m$

Felicia: $F = 460 - 40m$



Cost of TV Payment each month

- Match each function rule with its graph. Explain how you could make the matches without calculations or graphing tool help.
- What do the numbers in the rules for Darryl's account balances tell you about the values of their purchases and their monthly payments?
- What do the numbers in the rules for Felicia's account balances tell you about the values of their purchases and their monthly payments?
- What do the numbers in the rules for Emily's account balances tell you about the values of their purchases and their monthly payments?

Linear or Non-Linear Given a Table

①

x	0	5	10	15	20
y	-2	13	28	43	58

$$\frac{\Delta y}{\Delta x} = \frac{15}{5} = 3$$

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

②

x	0	3	6	9	12
y	14	12	10	8	6

$$\frac{\Delta y}{\Delta x} = \frac{-2}{3}$$

$$y = -\frac{2}{3}x + 14$$

Building	Stories	Height (ft)
Harris Bank III	35	510
One Financial Place	40	515
Kluczynski Federal Building	45	545
Mid Continental Plaza	50	582
North Harbor Tower	55	556

Not Linear

Source: The World Almanac

④

$$m = \frac{3}{2}$$

x	y
13	7
15	10
17	13
19	16

$$y = y_1 + m(x - x_1)$$

$$y = 7 + \frac{3}{2}(x - 13)$$

⑤

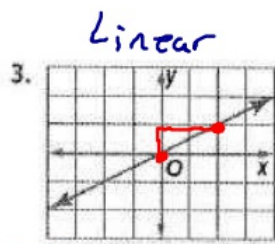
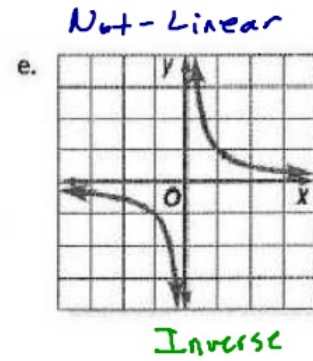
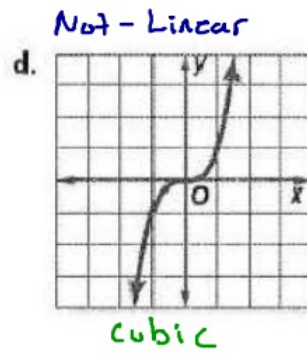
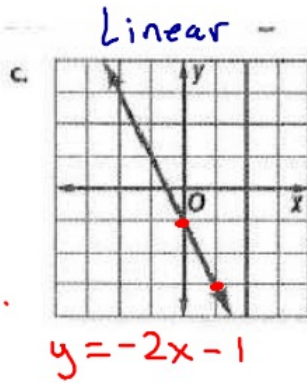
x	y
10	3
15	6
25	9
30	12

Not Linear

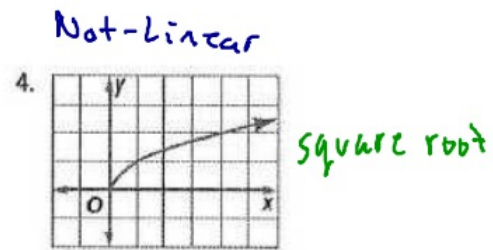
Time (h)	1	2	3	4
Distance (mi)	65	130	195	260

$$y = 65x$$

Linear or Non-Linear Given a Graph or Equation



$y = \frac{1}{2}x + 0$



x power of 1 in the numerator

f. $y = 2x^3 + 1$
not Linear

Linear
g. $y = 3x^1$

Linear
h. $y = \frac{x}{5}$

Linear
5. $y = \frac{x}{3}$

Non-Linear
6. $y = 2x^2$

Not Linear
7. $y = \frac{5}{x}$

How do you use information in a table, a graph, or the conditions of a problem to write a symbolic rule for a linear function?

1. **Dunking Booth Profits** The student council at Eastern High School decided to rent a dunking booth for a fund-raiser. They were quite sure that students would pay for chances to hit a target with a ball to dunk a teacher or administrator in a tub of cold water. The dunking booth costs \$200 to rent for the event, and the student council decided to charge students \$0.25 per throw.

a. How do you know from the problem description that *profit* is a linear function of the *number of throws*?

.25 per throw \rightarrow rate of change
-\$200 starting cost

b. Write a recursive rule for the dunking booth profits.

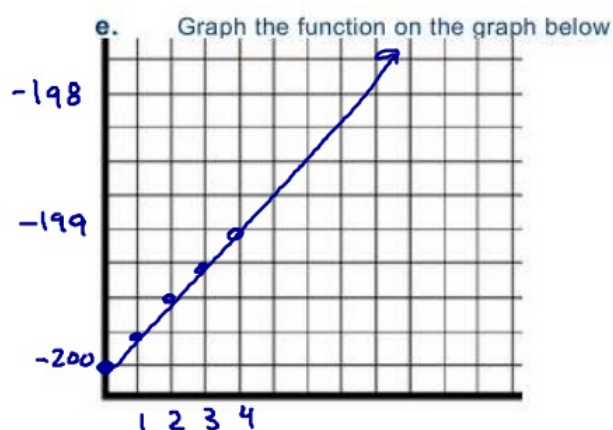
c. Write a function rule that shows how to calculate the profit P in dollars if t throws are purchased.

$$y = -200 + .25x$$

$$p = -200 + .25t$$

d. i. What do the coefficient of t and the constant term in your rule from Part c tell about the graph of profit as a function of number of throws?

ii. What do the coefficient of t and the constant term in your rule from Part c tell about a table of sample (*number of throws*, *profit*) values?



Arcade Prices : The owners of Game Time, Inc. operate a chain of video game arcades. They keep a close eye on prices for new arcade games and the resale value of their existing games. One set of predictions is the resale value of their existing games. One set of predictions is shown in the graph below.

- a. Which of the linear functions in the graph predicts the future price of **classic arcade games**?



- b. Which predicts the future resale value of arcade games that are **purchased now**? i. Find the slope and y-intercept for the classic arcade games.

Classic Arcade Games: slope = y-intercept = equation =

Games purchased now: slope = y-intercept = equation =

- ii. Explain what these values tell about classic arcade game prices.

3. **Turtles** The Terrapin Candy Company sells its specialty—turtles made from pecans, caramel, and chocolate—through orders placed online. The company web page shows a table of prices for sample orders. Each price includes a fixed shipping-and-handling cost plus a cost per box of candy.

Number of Boxes	1	2	3	4	5	10
Price(in Dollars)	20	40	60	80	100	200

- a. Explain why that price seems to be a linear function of the number of boxes ordered.

- b. What is the rate of change in order price as the number of boxes increases?

- c. Write a rule for calculating the price P in dollars for n boxes of turtle candies.

- d. Use your rule to find the price for 6 boxes and the price for 9 boxes of turtle candies.

Mult. Representations – Car Mileage Toolkit

Name: _____

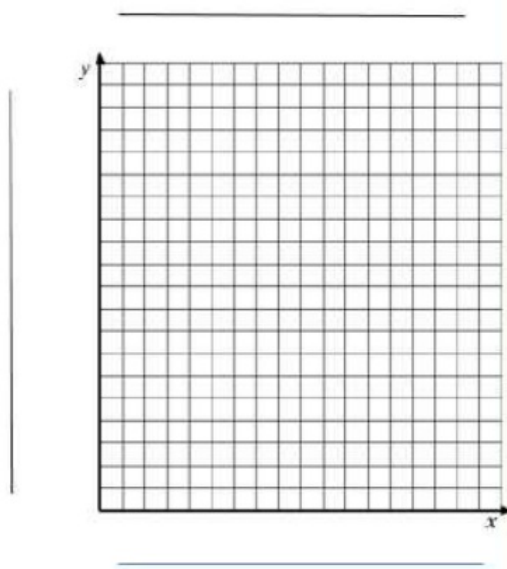
1. Your new Honda Civic car uses 1 gallon of gasoline every 25 miles. Right after filling the tank you start keeping track of how far you have driven.

- a.) Fill in the data table below and then make a graph to show the distance the truck travels on various amounts of fuel.

Start	1 gal	2 gal	3 gal	4 gal	5 gal
miles					

- b.) What is the rate of change?

- c.) Draw a graph of this relationship. Be sure to label your axes.



- c.) Write a " $f(x) =$ " rule for this relationship.

- d.) Check your rule against the table. Use the " $f(x) =$ " rule to find how many miles you have driven after using 4 gallons of gas.

- e.) How far have you traveled after you have used 10.5 gallons?

- f.) How many gallons does it take to drive 245 miles in your car?

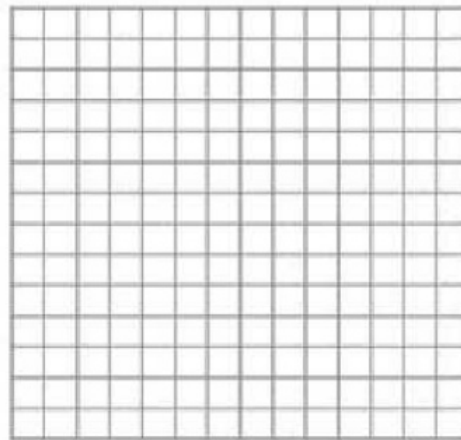
- g. If your car holds 15 gallons of gasoline. Can you drive 360 miles on one tank of gas? _____ Explain Your answer.

2. Charlie purchased a new iPad mini. He borrowed the money from his parents who generously will not charge him interest. Suppose he pays his parents the same amount each month. The table below shows the account balance after each monthly payment up to 6 months.

Number of Monthly Payments	1	2	3	4	5	6
Account Balance (in dollars)	400	360	320	280	240	200

a) Make a graph of the data provided in the table. Be sure to clearly label the axes and use appropriate scales.

b) Does Charlie's account balance appear to be a linear function of the number of monthly payments Explain.



c) How much is Charlie paying each month? (this is the rate of change) _____

d) What did the iPad Mini cost? _____ How can you see this on the graph? _____

e) Write a rule that gives Charlie's balance, B , after m monthly payments have been made. _____

f) How much will Charlie's balance be after 1 year? _____ After 18 months? _____

g) When will Charlie owe only \$40? (Show your work)