

LEARNING OBJECTIVE: We will graph linear functions and interpret their meaning based on problems in context. (G8M6L2)

ACTIVATING PRIOR KNOWLEDGE

The **initial value** (y -intercept) is OFTEN called the start up cost, the one-time fee, the initial charge, or the beginning amount. Can you think of other names we've used for the initial value?

"b"

flat fee, membership fee, entrance fee.

The **rate of change** (slope) is OFTEN called the unit cost, the unit rate, the miles per hour, the dollars per pound, etc. What other rates have we used to describe the slope of a line in context?

"m"

Monthly cost, cost per ride, dollars per hour

miles per gallon, gallons per minute

CONCEPT DEVELOPMENT

Pitfalls to avoid when graphing linear functions

Equations:

When you are given an equation, it may not ALWAYS be in $y = mx + b$ form.

Example: If I describe a situation where the cost for a iPad is \$599 and then I also have to pay \$30 per month for 4G service, I might write this equation:

$C = 599 + 30m$. What do you think "C" stands for?

→ "y" COST

What about "m"?

→ means month, not slope.

THIS CAN BE CONFUSING!! Why?

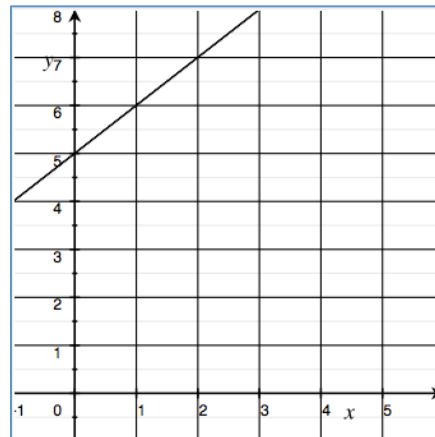
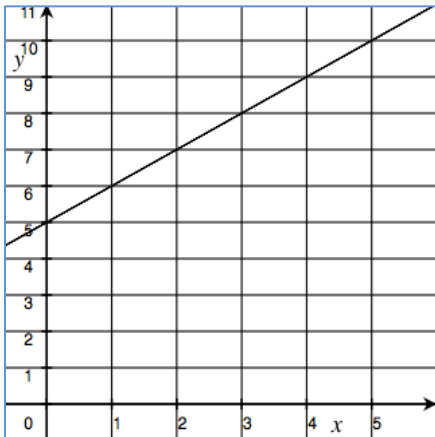
DON'T THINK SLOPE IS 599 just because it's first number

Graphs:

If the SCALES on two graphs are different, you may NOT be able to simply count squares.

Example: It costs \$5 to attend the school and candy bars cost \$1 each.

Two different graphs that show the above relationship look different:



GUIDED PRACTICE**Steps for Graphing Linear Functions**

1. Read the situation carefully.
2. Identify the initial value and rate of change if available.
3. If initial value and rate of change are not available, identify relevant information that can help you determine the initial value and rate of change.
4. Answer the relevant questions.

Jenna bought a car for \$18,000. Every year the value of her car will depreciate by \$2,500. This means that her car decreases in value by \$2,500 every year she owns the car. Let the value of the car in dollars be V and the number of years Jenna has owned the car be t .

- a. What is the value of the car when $t = 0$? Plot this point on the graph.

$\$18,000$ INITIAL VALUE

- b. What is the rate of change that relates V to t ? Is the rate of change positive or negative?

$-2,500$

- c. Find the value of the car when Jenna has owned the car for 1 year.

$\$15,500$

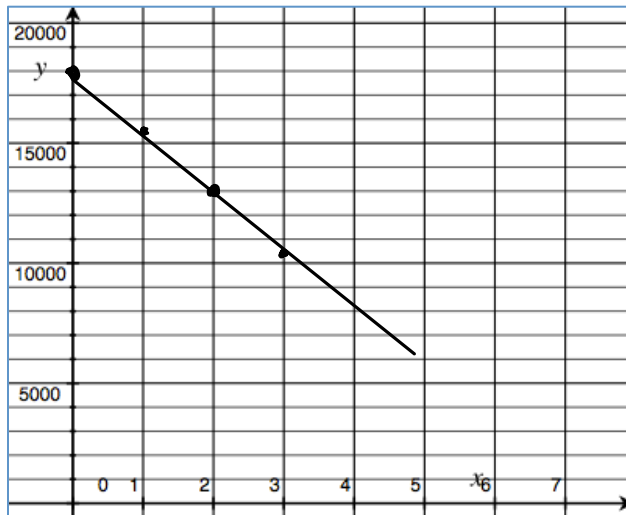
- 2 years?

$\$13,000$

- 3 years?

$\$10,500$

Plot the points on the graph to the right.



- d. Write the linear function that models the relationship between the number of years Jenna has owned the car and the value of the car.

$$V = 18,000 - 2,500t$$

Derek bought a scale for \$30 at Target, because he wanted to lose weight. Each week, he bought \$12 worth of protein shakes to help him. Let the total ~~about~~ amount of money spent be D and the number of weeks that have passed be w .

a. If Derek buys no protein shakes, how much will he have spent in his effort to lose weight? Plot the point on the graph.

\$30.00 Scale.

b. What is the rate of change that related the amount of money that Derek spends to the time that has passed?

\$12 per week / protein shakes

c. How much money has Derek spent trying to lose weight after 5 weeks? Graph this point.

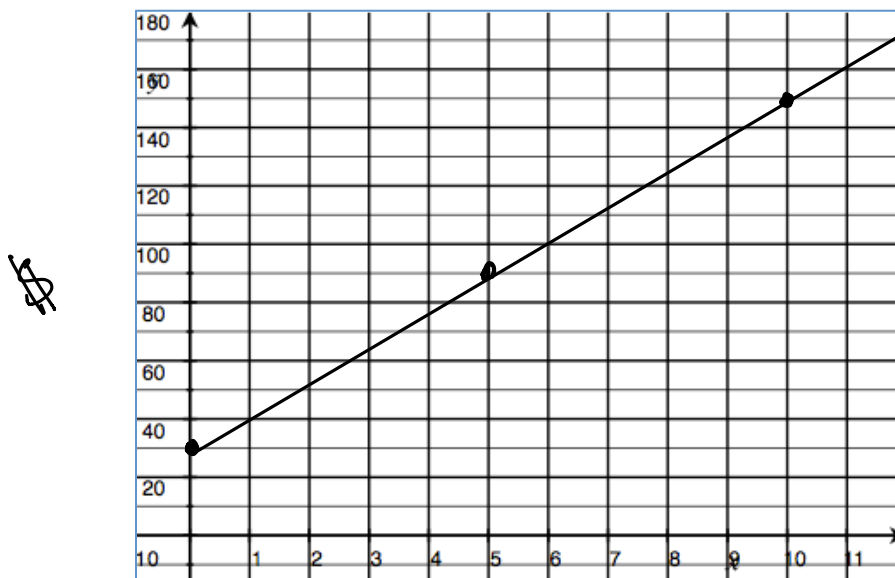
\$90

d. Derek has spent \$150 on his weight loss program (and it's working!!). How many weeks has he been trying to lose weight? Graph this point.

10 weeks.

e. Write a linear function that models the relationship between the amount of money Derek spends and the time that has passed. Graph this relationship.

$$D = 30 + 12w$$



Time (weeks)

Amazon has a new book available on their website. They estimate that if the book is priced at \$15 then 800 copies of the book will be sold per day, and if the book is priced at \$20 then 550 copies of the book will be sold per day.

a. Identify the ordered pairs given in the problem. Then plot both on the graph.

$(15, 800)$ $(20, 550)$

b. Assume the relationship between the number of books sold and the price is linear (AKA, assume the graph is a straight line). Use a straight edge and draw a line that passes through the two points.

c. What is the rate of change relating the number of copies sold to the price?

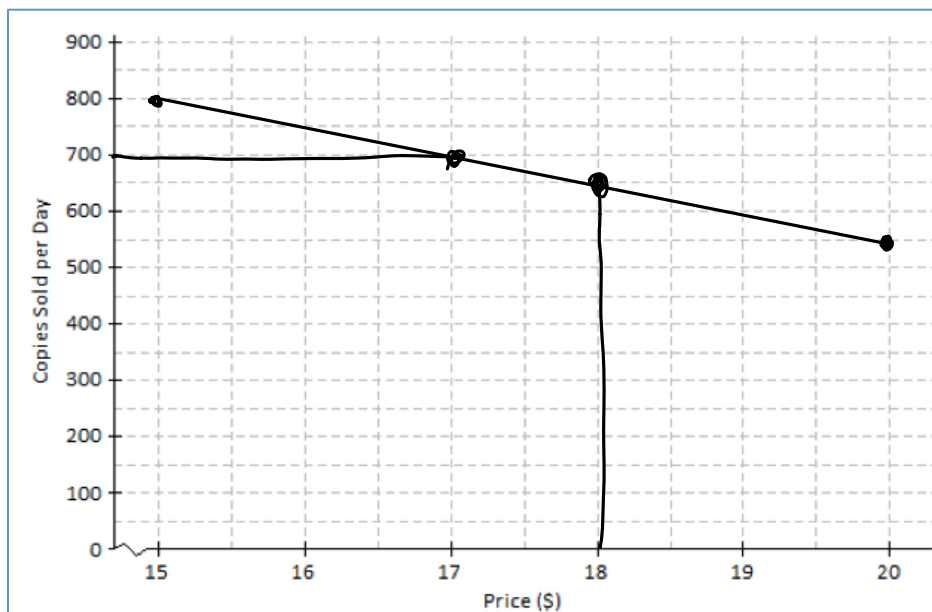
-50 For every \$ the price goes up, they sell 50 fewer copies.

d. Based on the graph, if the Amazon prices their book at \$18, about how many copies will they sell per day?

650

e. If Amazon wants to sell 700 copies of the book, what should they charge?

\$17.00



Name: _____

Math _____, Period _____

Mr. Rogove

Date: _____

INDEPENDENT PRACTICE

CLOSURE

NOTES

Lesson 3 from module 6