Foundations of Algebra — Unit 5: Linear Functions — Practice

Day 9 – Characteristics of Linear Functions in a Real World Context Name: Key

Practice Assignment Date: _____ Block: _____

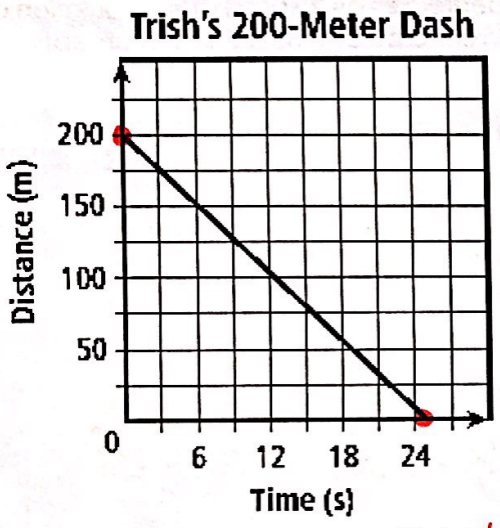
1. The Sandia Peak Tramway in in Albuquerque, New Mexico, travels a distance of about 4500 meters to the top of Sandia Peak. Its speed is 300 meters per minute. The function f(x) = 4500 – 300x gives the tram's distance in meters from the top of the peak after x minutes. Find and interpret the intercepts from the table below.

x minutes	0	2	5	10	15
f(x) = 4500 – 300x height (m)	4500	3900	3000	1500	0

x-int: (15,0) - At 15 seconds, you are on the ground or bottom of the peak.

y-int (0,4500) - At 0 seconds, you are at the top of the peak or 4500 meters high.

2. Trish can run the 200 meter dash in 25 seconds. The function f(x) = 200 – 8x gives the distance remaining to run after x seconds. (8 ↑ m)



a. What is the domain & range of the function?

domain: $0 \le x \le 25$ seconds

range: $0 \le y \le 200$ meters

b. What is the slope of the function? Explain what the slope means in terms of the problem scenario.

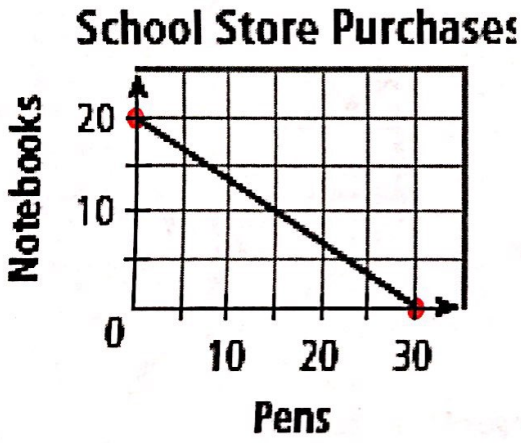
Slope is −8 meters per second. This means she gets 8 meters closer to the end every second.

c. What are the x and y intercepts? Explain what they mean in terms of the problem scenario?

x-int: (25,0) At 25 seconds, she has reached the end of the dash.

y-int: (0,200) At 0 seconds, she has 200 meters to run.

3. The school store sells pens for $2.00 and notebooks for $3.00. The equation 2x + 3y = 60 describes the number of pens x and notebooks y that you can buy for $60.



a. What is the domain and range of the function?

domain: $0 \le x \le 30$ pens

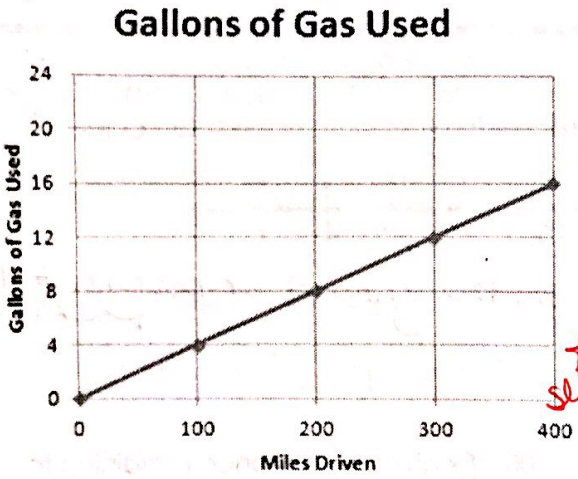
range: $0 \le y \le 20$ notebooks

b. What are the x and y intercepts? Explain what they mean in terms of the problem scenario?

X-intercept: (30,0) → If I purchase 30 pens, I can purchase 0 notebooks

y-intercept: (0,20) → If I purchase 20 notebooks, I can purchase 0 pens.

4.



a. What is the domain in context of the problem?

$0 \le x \le 400$ miles

b. What is the range in context of the problem?

$0 \le y \le 16$ gallons of gas

c. How many miles per gallon does this car get?

* slightly tricky setup

$\frac{100 \text{ miles}}{4 \text{ gallons}} = 25 \text{ miles per gallon}$

5. A fishing lake was stocked with 300 bass. Each year, the population decreases by 25 bass. The population of bass in the lake after x years is represented by the function $f(x) = 300 - 25x$. Calculate the x and y intercepts and then interpret them in terms of the problem scenario.

a. What are the x and y intercepts? Explain what they mean in terms of the problem scenario.

x-int ($y=0$)

$0 = 300 - 25x$

$+25x \quad +25x$

$\frac{25x}{25} = \frac{300}{25}$

$x = 12 \quad (12, 0)$

y-int ($x=0$)

$y = 300 - 25(0)$

$y = 300$

$(0, 300)$

At 0 years (or to start), there are 300 bass.

After 12 years, there are 0 bass remaining.

b. What is the domain of the function?

$0 \le x \le 12$ years

c. What is the range of the function?

$0 \le y \le 300$ bass

d. What is the slope of the function? Explain what the slope means in terms of the problem scenario.

Slope is -25 bass per year. Every year the lake loses 25 bass.

6. Emily wants to purchase songs that are $2 apiece on iTunes.

a. Create a function rule to describe this scenario.

$f(x) = 2x$

b. What would be the independent and dependent quantities?

x: # of songs downloaded

f(x): money spent

$\frac{40}{2} = \frac{2x}{2}$

$x = 20$

c. If Emily has $40 to spend, what would be the domain and range of the function?

Domain: $0 \le x \le 20$ songs (She can only purchase up to 20 songs for $40)

Range: $0 \le y \le 40$ dollars (She has a max of $40)