

Activity 1.2 – Linear Functions

FOR DISCUSSION: *What does the graph of a linear function look like?*

What can you say about the steepness of the graph of a linear function?

Informally, what is a continuous function?

1. A linear function $y = f(x)$ has slope 2 and passes through the point (4, 5).
 - (a) Find a point-slope form for f .

 - (b) Find the slope-intercept form for f .

 - (c) Find the x -intercept of f by solving the equation $f(x) = 0$ for x .

2. The population P of a town decreased linearly from 1915 to 1920. At the end of 1915, the population was 3250 people, and at the end of 1920 (not 1930!), the population was 3100 people. Let t be the number of years since the end of 1915.
 - (a) What was the change and the rate of change of the population between 1915 and 1920?

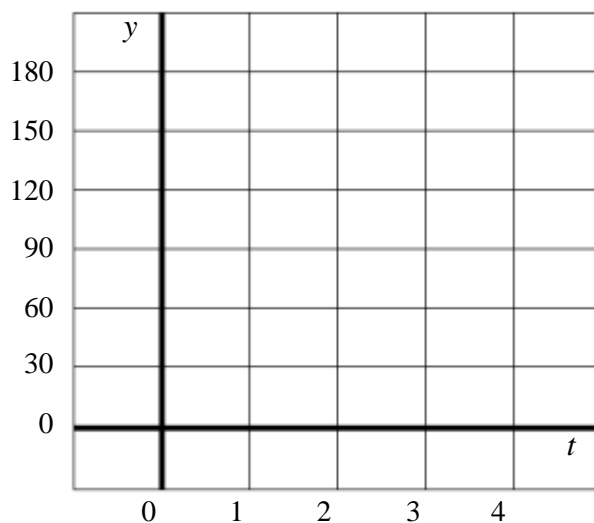
 - (b) Assuming a linear decrease, find the slope-intercept formula for the population t years after 1915.

 - (c) Use your answer to Part (b) to find the population at the end of 1925.

3. Bill and Sally leave Sally's house, and together they travel east at a constant speed of 40 miles per hour, passing Bill's house after 15 miles. Assume that position is negative to the west of Bill's house and positive to the east.

- (a) Complete the table showing the position s from Bill's house during the first four hours of the trip, plot the data points on the axes provided, and connect the points with a line.

Time t	Position s
0	
1	
2	
3	
4	



- (b) What is the slope of the graph of s ? What is the y -intercept? Write the slope-intercept form of the corresponding linear formula $y = s(t)$, with units.

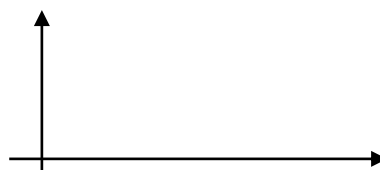
$$y = s(t) =$$

- (c) Find the t -intercept of the graph of s and interpret the meaning of the answer.

- (d) Interpret the meaning of the y -intercept of the graph of s .

- (e) Write a formula for the slope of s at any time t , with units. Call this formula $s'(t)$, and then sketch its graph.

$$s'(t) =$$



4. Let us generalize Part 3. Suppose Bill and Sally leave Sally's house, and together they travel east at a constant speed of 40 miles per hour. Assume that position is negative to the west of Bill's house and positive to the east. They begin their trip C miles from Bill's house, where C is a constant.

(a) What is the slope of the graph of the position function s ? What is the y -intercept? Write the slope-intercept form of the corresponding linear formula $y = s(t)$, with units.

$$y = s(t) =$$

(b) Write a formula for the slope (the rate of change of position), with units.

$$s'(t) =$$

(c) How many lines have a slope of 40? Write down three equations of lines that have a slope of 40.

(d) Instead of the distance from Bill's house, suppose we simply wanted the **distance traveled** by Bill and Sally during the first four hours of their trip. What would be the formula for s in this case?