

Quiz 2

1. Consider the following table.

| Year | Population (millions) | Rate of Change |
|-------------|----------------------------------|-----------------------|
| 1900 | 3 | — |
| 1910 | 6 | 0.3 |
| 1920 | 8 | |
| 1930 | 13 | 0.5 |
| 1940 | 19 | 0.6 |
| 1950 | 17 | -0.2 |
| 1960 | 24 | 0.7 |

Note: The Rate of Change column shows the average rate of change over the previous 10 years.

a. Compute the value for the Rate of Change column in 1920.

$$\begin{aligned} m &= \frac{y_2 - y_1}{x_2 - x_1} \\ &= \frac{8 - 6}{1920 - 1910} \\ &= \frac{2}{10} \\ &= \frac{1}{5} \text{ or } .2 \end{aligned}$$

b. Estimate the population in 1932.

Start with the population in 1930. Since the average rate of change from 1930 to 1940 is .6 (not .5), we add .6 to the population each year.

$$13 + 2 * .6 = 14.2$$

c. Without graphing, determine if this is a linear function. Explain your answer.

This table does not represent a linear function because the rate of change is not constant throughout. (It could, however, be described as a piecewise linear function, since each 10-year segment is linear.)

2. A particular junior college charges \$200 per credit hour in addition to \$450 in registration fees (regardless of the enrolled hours).

a. Write an equation $F(h)$ that determines the total fees for a student enrolled in h credit hours.

$$\begin{aligned} F(h) &= b + mh \\ &= 450 + 200h \end{aligned}$$

b. What is a reasonable domain for F ?

$h \geq 0$ or $h > 0$ (using interval notation, this would be $[0, \infty)$ and $(0, \infty)$, respectively)

c. Use your formula to determine the cost for a student enrolled in 15 credit hours.

$$\begin{aligned} F(15) &= 450 + 200 * 15 \\ &= 3450 \end{aligned}$$

d. A student received a bill for \$4050. For how many hours is she enrolled?

$$\begin{aligned} 4050 &= 450 + 200h \\ 3600 &= 200h \\ 18 &= h \end{aligned}$$

3. Graph the piecewise function

$$f(x) = \begin{cases} 1 + 2x & \text{if } x \leq 3 \\ 7 - \frac{1}{2}x & \text{if } x > 3 \end{cases}$$

