

Exercise 47

A phone company has a monthly cellular plan where a customer pays a flat monthly fee and then a certain amount of money per minute used for voice and video calling. If a customer uses 410 minutes, the monthly cost will be \$71.50. If the customer uses 720 minutes, the monthly cost will be \$118.

- Find a linear equation for the monthly cost of the cell plan as a function of x , the number of monthly minutes used.
- Interpret the slope and y -intercept of the equation.
- Use your equation to find the total monthly cost if 687 minutes are used.

Solution

Use the two given points, (410, 71.50) and (720, 118), to determine the equation of the line. Find the slope first.

$$m = \frac{y_2 - y_1}{x_2 - x_1} = \frac{118 - 71.50}{720 - 410} = \frac{46.5}{310} = \frac{3}{20}$$

Then use the point-slope formula with either of the two points to obtain the equation of the line.

$$y - 118 = \frac{3}{20}(x - 720)$$

$$y - 118 = \frac{3}{20}x - 108$$

$$y = \frac{3}{20}x + 10$$

The slope, $3/20 = 0.15$, is the cost per minute used for calling, and the y -intercept (0, 10) is the flat monthly fee. If 687 minutes are used, the cost is

$$y = \frac{3}{20}(687) + 10 = 113.05.$$