

## Exercise 36

For the following exercises, use the graph in Figure 8, which shows the profit,  $y$ , in thousands of dollars, of a company in a given year,  $t$ , where  $t$  represents the number of years since 1980.

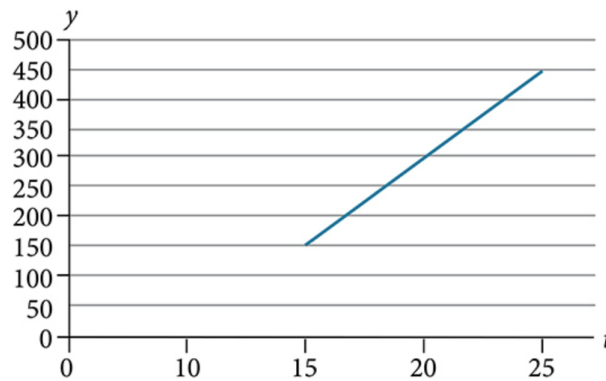


Figure 8

Find and interpret the  $y$ -intercept.

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### Solution

To write an equation for this line, two points on it are needed. Notice that when  $t = 15$ ,  $y = 150$ , and when  $t = 25$ ,  $y = 450$ :  $(15, 150)$  and  $(25, 450)$ . Determine the slope first.

$$m = \frac{y_2 - y_1}{t_2 - t_1} = \frac{450 - 150}{25 - 15} = \frac{300}{10} = 30$$

Then use the point-slope formula using either of the two points to get the equation of the line.

$$y - 150 = 30(t - 15)$$

$$y - 150 = 30t - 450$$

$$y = 30t - 300$$

To determine the  $y$ -intercept, set  $t = 0$ .

$$y = 30(0) - 300 = -300$$

Therefore, the  $y$ -intercept is  $(0, -300)$ . This means that in 1980 the company was losing \$300,000 per year, assuming a constant rate of increase.