

### Exercise 33

For the following exercises, use the graph in Figure 7, 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.

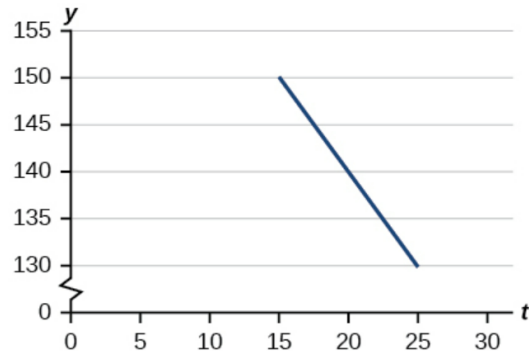


Figure 7

Find and interpret the  $x$ -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  $t = 25$ ,  $y = 130$ :  $(15, 150)$  and  $(25, 130)$ . Determine the slope first.

$$m = \frac{y_2 - y_1}{t_2 - t_1} = \frac{130 - 150}{25 - 15} = \frac{-20}{10} = -2$$

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

$$y - 130 = -2(t - 25)$$

$$y - 130 = -2t + 50$$

$$y = -2t + 180$$

To find the  $x$ -intercept, set  $y = 0$  and solve the equation for  $t$ .

$$0 = -2t + 180$$

$$2t = 180$$

$$t = 90$$

Therefore, the  $x$ -intercept is  $(90, 0)$ . This means the company will have a profit of \$0 in 2070, assuming the rate of decline doesn't change.