

Exercise 10

For the following exercises, consider this scenario: A town's population has been decreasing at a constant rate. In 2010 the population was 5,900. By 2012 the population had dropped to 4,700. Assume this trend continues.

Identify the year in which the population will reach 0.

Solution

The year in which the population hits zero can be predicted once the equation of the line is known. Use the two points on this line, (2010, 5900) and (2012, 4700), to determine the slope.

$$m = \frac{y_2 - y_1}{x_2 - x_1} = \frac{4700 - 5900}{2012 - 2010} = \frac{-1200}{2} = -600$$

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

$$y - 5900 = -600(x - 2010)$$

$$y - 5900 = -600x + 1\,206\,000$$

$$y = -600x + 1\,211\,900$$

Now set the population to zero and solve for x .

$$0 = -600x + 1\,211\,900$$

$$600x = 1\,211\,900$$

$$x = \frac{1\,211\,900}{600} \approx 2019.83$$

The year in which the population hits zero is roughly 2020.