

Exercise 12

For the following exercises, consider this scenario: A town's population has been increased at a constant rate. In 2010 the population was 46,020. By 2012 the population had increased to 52,070. Assume this trend continues.

Identify the year in which the population will reach 75,000.

Solution

The year in which the population hits 75,000 can be predicted once the equation of the line is known. Use the two points on this line, (2010, 46 020) and (2012, 52 070), to determine the slope.

$$m = \frac{y_2 - y_1}{x_2 - x_1} = \frac{52\,070 - 46\,020}{2012 - 2010} = \frac{6050}{2} = 3025$$

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

$$y - 46\,020 = 3025(x - 2010)$$

$$y - 46\,020 = 3025x - 6\,080\,250$$

$$y = 3025x - 6\,034\,230$$

Set the population to 75 000 and solve for x .

$$75\,000 = 3025x - 6\,034\,230$$

$$6\,109\,230 = 3025x$$

$$x = \frac{6\,109\,230}{3025} \approx 2019.58$$

The year in which the population hits 75,000 is roughly 2020.