

Exercise 25

A town's population increases at a constant rate. In 2010 the population was 55,000. By 2012 the population had increased to 76,000. If this trend continues, predict the population in 2016.

Solution

Because the town's population increases at a constant rate, the population can be modelled by a linear function. Let t be the number of years after 2010, and use the two given points, $(0, 55\,000)$ and $(2, 76\,000)$, to get the equation of the line. Determine the slope first.

$$m = \frac{y_2 - y_1}{t_2 - t_1} = \frac{76\,000 - 55\,000}{2 - 0} = \frac{21\,000}{2} = 10\,500$$

Use the point-slope formula and either of the two points to obtain the equation of the line.

$$y - 55\,000 = 10\,500(t - 0)$$

$$y - 55\,000 = 10\,500t$$

$$y = 10\,500t + 55\,000$$

Therefore, the population in 2016 is

$$y = 10\,500(6) + 55\,000 = 118,000.$$