

## Exercise 38

For the following exercises, consider this scenario: The population of a city increased steadily over a ten-year span. The following ordered pairs shows the population and the year over the ten-year span, (population, year) for specific recorded years:

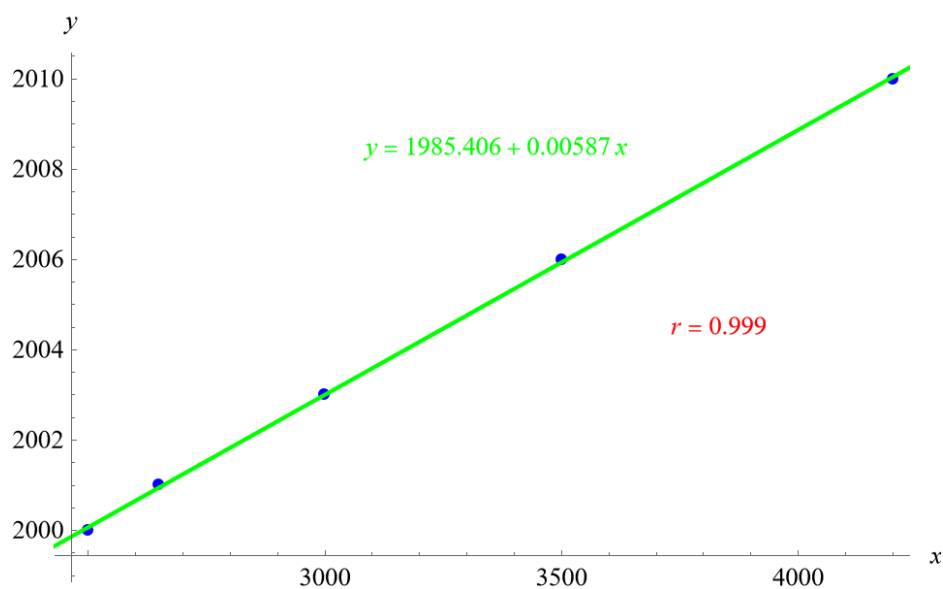
$$(2500, 2000), (2650, 2001), (3000, 2003), (3500, 2006), (4200, 2010)$$

Predict when the population will hit 8,000.

---

### Solution

Plot the following points on a graph: (46, 1600), (48, 1550), (50, 1505), (52, 1540), and (54, 1495).



Mathematica's FindFit function gives

$$y = 1985.406 + 0.00587x,$$

and Mathematica's Correlation function gives  $r = 0.999$ . To determine when the population will hit 8,000, set  $x = 8000$ .

$$y = 1985.406 + 0.00587(8000) \approx 2032.33$$

The population will reach 8,000 towards the middle of 2032.