## Exercise 12

For the following data, draw a scatter plot. If we wanted to know when the population would reach 15,000, would the answer involve interpolation or extrapolation? Eyeball the line, and estimate the answer.

Year	Population
1990	11,500
1995	12,100
2000	12,700
2005	13,000
2010	13,750

Solution

Graph the following points on a coordinate system: $(1990, 11\,500)$, $(1995, 12\,100)$, $(2000, 12\,700)$, $(2005, 13\,000)$, and $(2010, 13\,700)$.
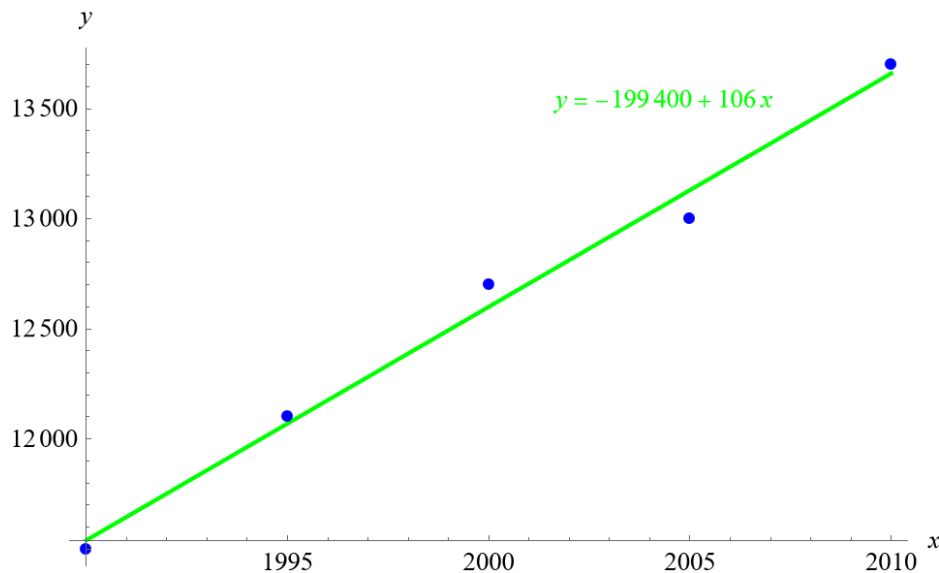
Mathematica's FindFit function is used to determine the line best fit to represent the data. Since 15,000 lies outside the range of the data we have $(11\,500 \leq P \leq 13\,700)$, this is extrapolation. Set the output equal to 15,000 and solve for x, the year.

$$15\,000 = -199\,400 + 106x$$

$$214\,400 = 106x$$

$$x = \frac{214\,400}{106} = 2022.64$$

According to the model, the population reaches 15,000 after the middle of 2022.