

Exercise 14

For the following exercises, consider this scenario: A town has an initial population of 75,000. It grows at a constant rate of 2,500 per year for 5 years.

Find a reasonable domain and range for the function P .

Solution

Because the town's population grows at a constant rate, a linear function can be used to model it. The slope is 2500, the rate that the town's population increases per year, and the initial population is 75 000.

$$P(t) = 2500t + 75\,000$$

Since the constant rate of population growth is for 5 years, the domain is $0 \leq t \leq 5$. The lowest and highest populations are

$$P(0) = 2500(0) + 75\,000 = 75\,000$$

$$P(5) = 2500(5) + 75\,000 = 87\,500.$$

Therefore, the range is $75\,000 \leq P \leq 87\,500$.