

LINEAR GROWTH

If a quantity starts at size P_0 and grows by d every time period, then the quantity after n time periods can be determined using either of these relations:

$$P_n = P_{n-1} + d$$

$$P_n = P_0 + d \cdot n$$

In this equation, d represents the common difference – the amount that the population changes each time n increases by 1.

Example

A coastal town recorded a dolphin population of 450 in 2012, and by 2018, the population had risen to 630. Assuming the dolphin population continues to increase at a steady rate, what is the expected population in 2025?

$$P_0 = \underline{\hspace{2cm}} \quad P_6 = \underline{\hspace{2cm}}$$

$$d = \text{slope} = \underline{\hspace{2cm}} = \underline{\hspace{2cm}} =$$

$$P_n = P_0 + d \cdot n, P_n = 450 + 105d \quad \text{EXPLICIT}$$

$$P_0 = 450, P_n = P_{n-1} + 105 \quad \text{RECURSIVE}$$

$$P_n = P_0 + d \cdot n$$

$$y = m \cdot x + c$$

Question

In a protected park, the number of oak trees was recorded at 3,200 in 2015. By 2020, the oak tree population had increased to 4,000. Assuming the tree population grows at a constant rate, what is the expected oak tree population in 2028?