

Endangered Bird Population

The population of a bird species on an island was decimated by an introduced predator that has now been eliminated. As it recovers it is predicted to grow according to the logistic growth model $P(t) = 3640 / (1 + 25 \exp(-0.04t))$.

What is the initial population?

What will the population be in 5 years?

In 150 years

In 500 years?

$$P(t) = \frac{3640}{1 + 25 e^{-0.04t}}$$

Handwritten notes: A pink arrow points to the 3640. Green dashed lines and arrows highlight the denominator structure, with '1 + A' and 'b-x' written below it.

$$P(0) = ? = \frac{3640}{1 + 25 \cdot e^{-0.04 \cdot 0}} \quad x^0 = 1$$

$$= \frac{3640}{1 + 25} = 140 \leftarrow$$

Handwritten notes: A pink arrow points to the 3640. The denominator is simplified from 1+25 to 1+A.

$$P(5) = \frac{3640}{1 + 25 \cdot e^{-0.04(5)}} \approx 170 \leftarrow e^x$$

Handwritten notes: A pink arrow points to the 3640. The exponent -0.04(5) is underlined.

$$P(150) = \text{" (150) } \approx 3,428$$

$$P(500) = \text{" (500) } \approx 3,640 \quad \underline{\underline{3639.99982}}$$



