

Assignment 31

Let P_s be the population at start, and P_e be the end population. From the lecture we derive the exponential growth after one year as: $P_e = P_s \left(1 + \frac{1.7}{100}\right)$. After n years we have a population of: $P_e = P_s \left(1 + \frac{1.7}{100}\right)^n$. Since we seek $P_e = 2P_s$, we obtain

$$\begin{aligned} 2P_s &= P_s \left(1 + \frac{1.7}{100}\right)^n && \Leftrightarrow \\ 2 &= \left(1 + \frac{1.7}{100}\right)^n && \Leftrightarrow \\ \log(2) &= \log \left(1 + \frac{1.7}{100}\right) n && \Leftrightarrow \\ n &= \frac{\log(2)}{\log \left(1 + \frac{1.7}{100}\right)} && \Rightarrow \\ n &\approx 41.12(a) \end{aligned}$$

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Assignment 32

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