

Problem 15

Suppose that a certain population obeys the logistic equation $dy/dt = ry[1 - (y/K)]$.

- (a) If $y_0 = K/3$, find the time τ at which the initial population has doubled. Find the value of τ corresponding to $r = 0.025$ per year.
- (b) If $y_0/K = \alpha$, find the time T at which $y(T)/K = \beta$, where $0 < \alpha, \beta < 1$. Observe that $T \rightarrow \infty$ as $\alpha \rightarrow 0$ or as $\beta \rightarrow 1$. Find the value of T for $r = 0.025$ per year, $\alpha = 0.1$, and $\beta = 0.9$.