Homework problem (the logistic growth curve p281 in the book)

DUE Monday 11/9

The logistic growth differential equation

\[ P'(t) = kP(M - P) \]

Has the solution

\[ P(t) = \frac{M}{1 + Be^{-Mt/k}} \]

1. What is the value of \( P(t) \) for \( t = 0 \)
2. What is the \( \lim_{t \to \infty} P(t) \)
3. Differentiate the solution to show that \( P'(t) = kP(M - P) \)
4. Find \( k, B, M \) for the following problem:
   In a lake there is 100 fish at time \( t = 0 \), after three month \( (t = 3) \) the lake has 250 fish. The maximum capacity of the lake is 1000 fish.

[Note: This is the same problem that we did in class, but note that we had the equation for \( P(t) \) wrong. The correct equation is given above].