Each problem is worth 5 points. For full credit provide proper justification for your answer.

1. Find a solution to the differential equation \( \frac{dm}{dt} = 100 - 0.3m \) subject to the initial condition that \( m(0) = 400 \).

2. Lake Superior has a volume of approximately 12.2 thousand km\(^3\), and an outflow rate of roughly 65.2 km\(^3\) per year. Write a differential equation that models the quantity \( Q \) of some pollutant in the lake over time.