

3. Solve the initial value problem $y' + (\sec(t))y = \sec(t)$ with $y(\pi/4) = 1$.

4. A stream feeds into a lake at a rate of $1000 \text{ m}^3/\text{day}$. The stream is polluted with a toxin whose concentration is 5 g/m^3 . Assume that the lake has a volume of 10^6 m^3 and that water flows out of the lake at the same rate of $1000 \text{ m}^3/\text{day}$. Set up a differential equation for the quantity of toxin $y(t)$ in the lake and solve it assuming that the initial concentration of toxins was zero. What is the limiting amount of toxin in the lake for large t ? What is the limiting concentration of toxins?