Reading
Sections 2.1, 2.2

1. Section 2.1, page 31, Problem 7c
2. Section 2.1, page 31, Problem 12
3. (a) Find the general solution for \[ \frac{dy}{dx} + 2xy = 1 \]

(b) Given that \( y(2) = 1 \), estimate \( y(3) \).
4. Section 2.2, page 38, Problem 2
5. Solve the initial value problem
\[ y' = xy^3(1 + x^2)^{-1/2}, \quad y(0) = 1 \]
and determine the interval on which the solution is defined.
6. Solve
\[ \frac{dx}{dt} = 2 - tx^2 - t + 2x^2 \]

Hint: factor the right hand side into the form \( g(t)h(x) \)
7. Solve the initial value problem describing the deer population from Homework 1,
\[ \frac{dP}{dt} = rP(1 - \frac{P}{N}) \]
\[ P(0) = P_0 > 0 \]
where \( N \) and \( r \) are constants.
Use your solution to determine \( \lim_{t \to \infty} P(t) \)