Differential Equations

1. (a) Find some solutions of the differential equation $y' = x$.

   (b) Find some solutions of the differential equation $y' = \frac{1}{2}(x^2 - 1)$.

   (c) Find some solutions of the differential equation $y' = \sin(x) + x^5 + \ln(x)$.

2. Find some solutions of the differential equation $y' = y$.

3. (a) Show that each of the following functions

$$\frac{1 + ce^t}{1 - ce^t}$$

   is a solution of the differential equation $y' = \frac{1}{2}(y^2 - 1)$.

   (b) Find a solution of this differential equation that satisfies the initial condition $y(0) = 2$.