1. Find a solution or a family of solutions to the initial value problem $\frac{dx}{dt} = x^3, x(1) = 1$.

2. Sketch the phase portrait in phase space for $\dot{x} = x(1-x)(2+x)$.

3. Rewrite the differential equation $\ddot{x} + 4\dot{x} - (\cos t)x + 5 = 0$ as a system of first order differential equations.