Assignment 3

1. Consider the differential equation $\frac{dy}{dt} = y^2 - 2y - 8$

a) Sketch the phase lines. Identify the equilibrium points as source, sink or nodes.

b) Using only one set of axes, sketch graphs of the solutions that correspond to the initial conditions

y(0)=-3 y(0)=0 y(0)=6

c) Solve the differential equation analytically.

2. Solve the linear differential equation

$$\frac{dy}{dt} + \frac{2}{t}y = 3e^{-t} \qquad y(1) = 0$$

And sketch a graph of the solution in the window given below.