Assignment #9 ***Math 181*** ***Name:***

1. Solve the following differential equations:

a) $\dfrac{dy}{dx} = \dfrac{e^{2-x-3y}}{e^{3x+y+1}}$

b) $\dfrac{dy}{dx} = x^2y^2 - 5xy^2 + y^2$

c) $\dfrac{dy}{dx} = \dfrac{x^2 y - 32}{16 - x^2} + 2$

d) $\dfrac{dy}{dx} = y^3 \sin x;\ \ y(0) = 1$

e) $\frac{dy}{dx} = \frac{2}{3}(y-1)^{1/2}\ ;\ y(1) = 1$

f) $\frac{dy}{dx} = y^2 - 3y - 10$

2. A tank contain 500 gallons of brine with 4lbs of dissolved salt. Brine that contain 0.2 lbs of salt per gallon enters the tank at a rate of 4 gal /min. The solution is kept thoroughly mixerd and drains from the tank at the same rate of 4 gal/min.

   a) Set up an IVP for the amount of salt A(t) as function of time t (in minutes)

   b) Determine the concentration of the salt in the tank after one hour.

3. Set up an IVP for a mortgage loan of $650,000 at interest rate of 4.5% per year for 30 years. Then determine the monthly payment of the loan and the total interest amount after 30 years.