Math 217 - September 7, 2010

- Separable differential equations
- Logistic equation
- First order linear equations

1. $\dfrac{dx}{dt} = kx$ (where k is an arbitrary constant)
2. $\dfrac{dy}{dx} = 3e^y x^2$
3. $\dfrac{dy}{dx} = \dfrac{\sin x}{y \cos y}$
4. $\dfrac{dy}{dx} = -9x^2y^2$
5. $\dfrac{dy}{dx} = -2xe^y$
6. $\dfrac{dy}{dx} = \dfrac{4x}{y-1}$
7. $\dfrac{dy}{dx} = \dfrac{y^2-1}{x} \qquad y(1) = 2$

Lecture Problems

8. For the first order linear equation:
   (a) Find the integrating factor: $\rho = e^{\int P(x)\,dx}$
   (b) Multiply the integrating factor through the differential equation.
   (c) Make sure the left hand side is equal to $(\rho y)'$.
   (d) Integrate the right hand side.
   (e) Solve the differential equation.

   $$\frac{dy}{dx} - 2y = 4 - x$$

9. Solve the first order linear equations
   (a) $\frac{dy}{dx} + 3y = 2$
   (b) $\frac{dy}{dx} - 3y = 2$
   (c) $\frac{dy}{dx} - 3y = 2x$
   (d) $\frac{dy}{dx} - 3xy = 2x$