

Math 334—Assignment 1

1. Solve the initial value problem:

$$x^2 dx + 2y dy = 0, \quad y(0) = 2.$$

2. Find the general solution to the equation:

$$x \frac{dy}{dx} + 3(y + x^2) = \frac{\sin x}{x}.$$

3. Solve the initial value problems:

$$(ye^{xy} - 1/y)dx + (xe^{xy} + x/y^2)dy = 0, \quad y(1) = 1;$$

$$(x + 2) \sin y + (x \cos y)y' = 0, \quad y(1) = \pi/2.$$

4. Find the general solution to each equation:

$$\frac{dy}{dx} - y = e^{2x}y^3,$$

$$\frac{dy}{dx} = \frac{y(\ln y - \ln x + 1)}{x},$$

$$\frac{dy}{d\theta} + \frac{y}{\theta} = -4\theta y^{-2}.$$

5. Find the general solution to the second order equation:

$$y'' - 5y' + 6y = 0.$$

6. Solve the second-order initial value problem:

$$y'' - 6y' + 9y = 0, \quad y(0) = 2, \quad y'(0) = 25/3.$$

7. To see the effect of changing the parameter b in the initial value problem

$$y'' + by' + 4y = 0, \quad y(0) = 1, \quad y'(0) = 0,$$

solve the problem for $b=5, 4$, and 2 . Graph the solutions on your graphing calculators to observe the change in behaviour. You do not need to present the graphs with the assignment solutions.