MATH 3D, DIFFERENTIAL EQUATIONS
SAMPLE MIDTERM

Problem 1.

Find the general solution of the equation

$$xy^2 y' = x^2 + y^3$$

Problem 2.

Solve the initial value problem

$$\begin{cases} (y + \sqrt{xy})dx = xdy \\ y(1) = 1 \end{cases}$$

Problem 3.

Solve the initial value problem

$$\begin{cases} y''' - y'' - y' + y = 0 \\ y(0) = 2 \\ y'(0) = 0 \\ y''(0) = 2 \end{cases}$$

Problem 4.

Find the general solution of the equation

$$y'' - y = 3 + e^{3x} \cos x$$