WRITTEN HOMEWORK 1

MATH 46 SEC 030

This homework will be due on Thursday Apr 9th.

Question 1. Show that $y = c_1e^x + c_2e^{3x}$ is the general solution of $y'' - 4y' + 3y = 0$. Find the solution to the initial value problem

$$\begin{cases} y'' - 4y' + 3y = 0. \\ y(0) = 1, y'(0) = 5. \end{cases}$$

Question 2. Show that $y = c_1 \sin(2x) + c_2 \cos(2x)$ is the general solution of $y'' + 4y = 0$. Find the solution to the boundary value problem

$$\begin{cases} y'' + 4y = 0. \\ y(-\frac{\pi}{8}) = 2\sqrt{2}, y(\frac{\pi}{8}) = \sqrt{2}. \end{cases}$$

Question 3. Write the following differential equation in standard form

$$(\sin x)e^{y'} + e^x y = \cos x$$

Question 4. Write the following differential equation in differential form

$$(y' + y)^5 = 1/x$$

Question 5. Determine whether the following differential equation is exact.

$$\frac{dy}{dx} = \frac{-xy^2}{x^2y + y^3}$$

Question 6. Determine whether the following differential equation is homogeneous.

$$y' = \frac{xy \sin \frac{x}{y}}{x^2e^{x/y} + y^2}$$