Name:

Math 221, Section 6

Old! Exam 2

Show all work. How you get your answer is just as important, if not more important, than the answer itself. If you think it, write it!

1. Find all solutions to the homogeneous equation
$$y'' - 2y' + 5y = 0$$

2. The homogeneous equation
$$y'' - \frac{1}{x}y' + \frac{1}{x^2}y = 0$$
has, as one solution, the function $y = x$. Use reduction of order to find a second, linearly independent, solution.

3. Use the method of undetermined coefficients to find a particular solution to the differential equation
$$y'' - 2y' - y = \sin(x)$$

4. The homogeneous differential equation
$$y'' + \frac{4}{x}y' + \frac{2}{x^2}y = 0$$
has solutions $y_1 = x^{-1}$ and $y_2 = x^{-2}$. Use variation of parameters to find a particular solution to the inhomogeneous equation
$$y'' + \frac{4}{x}y' + \frac{2}{x}y = \sin x$$

Missing: solutions to higher order, constant coefficients, equation