

**INSTRUCTIONS: PLEASE READ CAREFULLY**

1. Write your name and section number above. Two points deducted if either is missing or illegible.
2. Show your work and put a box or circle around your answers.
3. Always write equations.
4. Partial credit will be given only if your work is written clearly and in equations.
5. If you have time, check your answers by differentiation and substitution!

**Problem 1.** (30 pts) Write down the general solutions to these differential equations. Use sines and cosines rather than complex exponentials where applicable. Write down only as much work as you need to solve the problem.  $k$  is a constant. Derivatives  $y', y''$  are with respect to  $x$ .

(a)  $y' + ky = 0$

(b)  $y'' + k^2y = 0$

(c)  $y'' - k^2y = 0$

(d)  $y'' + 2y' + 5y = 0$

(e)  $y'' + 6y' + 5y = 0$

(f)  $y'' + 6y' + 9y = 0$

Exam #2, March 6, 2013

Math 527, University of New Hampshire

**Problem 2.** (35 pts) Find the general solution of the differential equation. Derivatives  $y'$ ,  $y''$  are with respect to  $x$ .

$$y'' + 6y' + 8y = 3e^{-2x} + 2x$$

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**Problem 3.** (35 pts) Find the general solution of the differential equation. Derivatives  $y'$ ,  $y''$  are with respect to  $t$ .

$$y'' + 4y' + 4y = t^{5/2}e^{-2t}$$