Math 225
Introduction to Ordinary Differential Equations
Review Problems for Midterm # 2
due at tutorial week of Mon Mar 14th

Instructions: The content of Midterm #2 is chapter 4, all sections, except section 4.7. All assignment, pre-lecture homework, group work, and lecture content is testable. You are strongly encouraged to review all of the above. In order to review section 4.8, in particular, familiarise yourself with the examples covered in class, in the assignment, and in the pre-lecture homework.

Below are listed a few review problems which you can use to further test your understanding of the material. During tutorials the week of March 14th, the TAs will go over any questions you have about the material below. There won't be time during tutorial to go over all of the problems below, so make sure that you know which ones give you trouble, and be prepared to ask questions about those.

Note that there are no problems from sections 4.1-4.3. This is because the task of finding solutions to the homogeneous equation is part of solving any problem in sections 4.4-4.10.

1. Section 4.4, some of #27-32
2. Section 4.4 #33
3. Section 4.5 #2, #8
4. Section 4.6 #6
5. Section 4.9 #3, #11
6. A 2 kg mass is attached to a spring with spring constant 10 N/m. At time $t = 0$, the mass is displaced 1 m to the right of the equilibrium position and released. At this same instant, an external force $F(t) = 20\cos(t)$ N is applied to the mass. If the damping constant for the damping constant for the system is 4 Ns/m,
   (a) determine the equation of motion for the mass and,
   (b) determine the resonance frequency of the system.