MATH 242
D. Meade

University of South Carolina
Spring 1995

Homework Problems for Chapter 3

Due: the class meeting following discussion in class

Section	Page	Problems
3.2	81	# 1, 4, 7, 17, 20
3.4	96	# 1, 3, 4, 8, 13
3.5	107	# 8, 9, 13, 15, 20

Notes

- These problems are chosen as the minimum set of problems that you should solve.
- Most problems in Sections 2 and 4, and a few from Section 5, ask a question about a physical problem whose description is provided. In each case, you will need to first find an ODE related to this problem and then a solution to the ODE. Only after this is complete will you be able to answer the question.

  The minimal information that must be included for each problem of this type is i) the ODE, ii) the solution to the ODE, iii) the answer to the question. All the answers should be reasonable (e.g., masses should be positive); identify and explain (if possible) any surprising answers. Be certain to explain any assumptions that you make.
- *I do not recommend the memorization of any formulas!* The important idea is that you understand how the equations are derived, how to find a solution to the equation, and then be able to interpret the solution to answer a question.
- A few problems, most notably the numerical methods problems in Section 3.5, do not fit the above pattern. Be sure to follow the directions for these problems. In addition, determine if the exact solution to each of these can be found.

  For problems 13 and 15, start with a single step ($h = 1$) and halve the stepsize until the appropriate error condition is satisfied.

  For problem 20, plot your solutions. Describe any differences between the three solutions with different values of r.
- Remember that these problems focus on two different objectives. One goal is the translation of a physical situation into a differential equation and the interpretation of the solution in the context of the original problem. The second goal is to practice the different solution techniques.
- If you have any difficulties, please ask me for assistance.