

# REVIEW SHEET FOR TEST 1

The best way to prepare for a test is to review homework problems, examples from the textbook and class notes. Do as many review problems as necessary. Make sure that you can solve these problems in a reasonable amount of time without reference to the textbook or class notes. It is important that on the test you show all your work and explain your answers. Just answers (especially wrong ones!) without any explanation will earn you no credit.

## List of major topics covered in class.

1. Modeling: Unlimited Population Growth, Logistic Population Model. Equilibrium solutions. Review problems: # 3, 5, 6, 7, 11, 17 on pp.14-19.
2. Differential equations and their solutions. Review problems: # 1, 2, 3 on p. 33. Remember that you can always **check** your solution to the initial value problem by substituting it back into the equation and into the initial condition. **Do it!**
3. Separation of variables technique. Don't forget about those (often **missing**) equilibrium solutions. Mixing problem. Review problems: # 7, 9, 11, 15, 16, 27, 29, 31, 37, 39, 42 on pp. 33-36.
4. The geometry of differential equations: slope fields. Review problems: # 3, 6, 9, 13, 14, 15, 16, 18 on pp. 47-51.
5. Euler's method. You should understand and remember formulas on page 54. Review problems: # 1, 2, 5 on pp. 61-62.
6. Existence and uniqueness of solutions. You should know the statement of existence and uniqueness theorem and at least one example when a solution of the initial value problem is not unique. Review problems: 1, 3, 5, 9, 13, 18 on pp. 71-73.
7. Equilibrium points and their classification. Phase line. Review problems: #3, 5, 8, 15, 17, 31, 33, 37 on pp. 89-91.
8. Solving linear differential equations by the method of "integrating factors." Mixing problems. Review problems: # 1, 3, 5, 6, 7, 9, 11, 15, 24, 25 on pp. 133-135.

**Additional review problems:** #1, 3, 5, 11, 13, 21, 25, 27, 31, 33, 35, 37, 39, 40, 41, 43, 47, 49, 54 on pp. 136-141.

**GOOD LUCK!**