

3450:335 Ordinary Differential Equations, Kreider
Exam 1 Preparation

The exam is scheduled for Monday 24 June. You will need a calculator on several problems. There are 8 problems from the sections we've covered in Chapters 1, 2 and 3 – 5 on techniques and 3 on modeling. All problems come from the list below, so study only those topics.

On my web site, there are sample exams with answer keys, as well as additional sample problems with an answer key. Ignore the problem on the Existence-Uniqueness Theorem. In the text, problems 19-30 in the Chapter 2 review are good to study.

It is important that you show your work on each problem. I am testing you on your understanding of the techniques you've learned.

Topics you should be prepared for are

- Separable equations
- Integrating factor for linear equations
- Exact equations
- Homogeneous equations
- Bernoulli equations
- Models
 - Exponential growth and decay. Know the standard ODE and solution form. Be able to substitute numerical values and do computations with the formula.
 - Falling bodies via Newton's Second Law. Be able to construct an ODE from $ma = F$ and a list of forces, and be able to solve the ODE when the forces are of simple form.
 - Newton's law of cooling. The formula for $T(t)$ will be given. Be able to substitute numerical values and do computations with the formula.
 - Logistic growth. The formula for $P(t)$ will be given. Be able to substitute numerical values and do computations with the formula.
 - Pollution in a lake. Know the standard form $\frac{dP}{dt} = [rP_{in} + D] - \frac{r}{V}P$. Be able to substitute numerical values and solve the ODE.