

Last update: Tue Sep 25 11:23:52 MDT 2007 /m333.fa07/handouts333/t1_333_928/review_suggestions_1.tex

- 1 This list is not in final form. Like, stuff may yet be added to it.
- 2 Test #1 is

Friday
9/28/07.
- 3 The test will cover the material of Assignments #1 – #7. See also the topic list below.
- 4 You must have a simple scientific calculator for the exam. The moral equivalent of a TI-30: arithmetic, logarithms, exponentials, trig functions, inverse-trig functions, but no text-storage memory, no wireless capability, no graphing capability, and no computer-algebra system.
- 5 Topics to know about:
 - (i) How to find the RREF of a matrix.
 - (ii) Given an augmented matrix in RREF form, be able to interpret the matrix to give a column-matrix formula for the solutions, if possible.
 - (iii) Give a column-matrix formula for the solutions of a system of linear equations in the case that the system has many solutions. This is important when we go after eigenvectors.
 - (iv) What is an ordinary differential equation?
 - (v) Can you set up a “mixing problem”?
 - (vi) What is a solution for a differential equation?
 - (vii) What is a solution for an initial-value problem?
 - (viii) Calculus-I and -II derivatives and antiderivatives.
 - (ix) Can you instantly write down a solution to an initial-value problem involving a differential equation which states that the time rate of change of some quantity is directly proportional to that quantity?
 - (x) What is an equilibrium solution of a differential equation? And how do you spot equilibrium solutions?
 - (xi) What is an autonomous differential equation?
 - (xii) What is a first-order *linear* differential equation?

- (xiii) Solving a first-order linear differential equation via the integrating-factor trick.
 - (xiv) Solving initial-value problems involving first-order linear differential equations.
 - (xv) What is the existence and uniqueness theorem for initial-value problems involving first-order linear differential equations? How does this theorem differ from the existence and uniqueness theorem for initial-value problems involving differential equations of form $\mathbf{y}' = \mathbf{f}(t, \mathbf{y})$?
 - (xvi) What does it mean to say that the variables in a first-order differential equation separate?
 - (xvii) What is the existence and uniqueness theorem for initial-value problems involving differential equations of form $\mathbf{y}' = \mathbf{f}(t, \mathbf{y})$?
 - (xviii) How to make a by-hand direction field by means of nullclines, isoclines, and equilibria.
 - (xix) Given a direction field, can you tell whether it belongs to an autonomous differential equation?
 - (xx) Match up an initial-value problem with a solution graph or direction-field plot. Without actually *solving* the initial-value problem, like.
 - (xxi) Solution methods for first-order differential equations we currently “know”:
 - (a) MATH 170-175: $\mathbf{y}' = \mathbf{f}(t)$
 - (b) First-Order Linear differential equations (aka **1OLDE**)
 - (c) Differential equations whose variables separate.
 - (d) “Exact” differential equations.
 - (e) Discontinuous differential equations, and how to handle the initial-value problems affiliated therewith.
- 6** From the 9/17/04 test, relevant problems: 1, 2, 3, 4, 5, 6, 7 (Note that there’s no matrix stuff on this old test).
- 7** From the 9/23/05 test, relevant problems: 1, 2, 3, 4, 5, 6 (Note that there’s no matrix stuff on this old test).