

Calculus III - Prof. Manolescu: Preparation for the Final Exam

The final will take place on Monday December 17, in class, from 1:10 to 4:00 pm. No books or calculators are allowed.

The exam will cover all the material in this class, with emphasis on the parts not covered on the two midterms. Roughly, 20 % of the questions will be from the material before the First Midterm, 20 % from the material for Midterm II, and 60 % from the material after Midterm II.

To receive full credit, you will need to fully justify your answers (except when otherwise noted, such as on True/False questions).

You should review the practice sheets for Midterm I and II. From the newer material (after Midterm II), some things you should pay attention to are:

- recognizing critical points of functions of two variables (local minima, local maxima, saddles) by the Second Derivatives Test; find absolute maxima and minima; make sure that the domain is closed and bounded;
- if the domain is closed and bounded, the absolute maximum or minimum can be at any of the following: the critical points in the interior, the critical points of the restriction to the boundary, the endpoints of each component of the boundary;
- the method of Lagrange multipliers; the three types of optimization problems: function of 2 variables with one constraint, function of 3 variables with one constraint, function of 3 variables with two constraints;
- complex numbers: addition, multiplication, conjugates, division, polar form, powers, roots, exponential, logarithm;
- solving homogeneous and nonhomogeneous ODEs of second order; ignore the method of variation of parameters, which is not covered in this class.

In particular, note that there was no homework on ODEs, but these will be covered on the exam. I recommend doing the following practice problems from Chapter 17:

1. Section 17.1: Exercises 2, 4, 6, 8, 10, 20, 24, 30, 32
2. Section 17.2: Exercises 2, 4, 6, 8, 10

Other practice problems (for the material after Midterm II):

1. End of Chapter 14, Questions 7-12 on the True-False Quiz on p. 945
2. End of Chapter 14, Exercises 52, 54, 55, 56, 59, 60, 61, 62, 63, 64 on p. 947
3. Appendix H, Exercises 6, 8, 16, 22, 34, 38, 40, 46 on p. A64
4. End of Chapter 17, Questions 1-2 on the True-False Quiz on p. 1138
5. End of Chapter 17, Exercises 6, 8, 12, 14 on p.1138