

## Math 1XX3 Final Exam Info Sheet

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The purpose of this handout is to help you study by listing the concepts, definitions, and results you will need to know for the final

**Exam Information.** The final exam will be on Saturday April 16, 2016 from 12:30-3:00PM. The final exam will take place in

### IWC 1

and will 2.5 hours long. You will *not* be allowed to bring in any notes or use the text book. You will be allowed to use the standard McMaster Calculator (Casio FX-991). You must bring your **Student Card** – you will not be able to write the exam without your student card.

**Exam Format.** The exam contains 15 questions and is out of 75 points. Approximately 12.5% of the exam will be on Chapter 9, 12.5% will be on Chapter 10, 25% will be on Chapter 11, and 50% will be on Chapter 14. The format will be similar to the midterms (a combination of multiple choice and short answer questions).

**Material Covered.** The exam is cumulative. Below, I have given a breakdown of what you will need to know from each chapter (also see the review sheets from the midterms). Note that when you are learning terms, it is good to think of an example of that satisfies that term, and one that does not satisfy that term.

**Chapter 9.** Know how to solve separable differential equations (Section 9.3) and linear equations (Section 9.5). Also know how to use Euler's method (Section 9.2). There are no questions on models for population growth.

**Chapter 10.** Know how to find the derivative of a curve defined by parametric equations (Section 10.2) and know how to do calculus in polar coordinates, i.e., arclength and areas (Section 10.4). There are no questions on conic sections.

**Chapter 11.** In addition to knowing the topics on the previous review sheet, know how to approximate functions using Taylor polynomials (Section 11.11).

**Section 14.1.** Know what is meant by a function in many variables. Know what we mean by the graph of a function. Know what a level curve is.

**Section 14.2.** Know what we mean by a limit for a two variable function (Definition 1. on page 904). Know how to show to compute limits or verify that a limit does not exist. Note that I do not expect you to know how to do a  $\delta - \epsilon$  proof like we did in class (i.e., like Example 4 on page 907). Know what it means for a function to be continuous.

**Section 14.3.** Know how to compute the partial derivative of a function. Know Clairout's Theorem (page 919). You do not need to know about partial differential equations.

**Section 14.4.** Know how to find the tangent plane of a function near a point (see page 928). Know what it means for a function to be differentiable. You do not need to know about differentials.

**Section 14.5.** Know how to use the chain rule for a function in many variables. Be able to do implicit differentiation.

**Section 14.6.** Know what the directional derivative is. Know what a unit vector is. Know what the gradient vector is. Know how to maximize the directional derivative (see page 952). Know the geometric significance of the gradient vector.

**Section 14.7.** Know what we mean by the local maximum and local minimum value. Know what we mean by a critical point and how to find the critical points. Know what we mean by a saddle point. Know how to use the Second Derivative Test (page 961) to determine if a critical point is a local maximum or minimum value. Know what we mean by the absolute maximum and minimum values, and how to find these values (see page 966).

**Section 14.8.** Because I gave no WebAssign questions on Section 14.8, I will pick a question from among Exercises 3-7 of Section 14.8 for the final.

**Final Mark.** When computing the final mark, I will use the HIGHER of the following two weightings:

**Weight 1.** (As described in the course handout)

- Maximum among {WebAssign average, Midterm grades, Final Exam grade} = 10%
- Two midterm tests  $2 \times 24\% = 48\%$
- Final Examination 42%

**Weight 2.**

- Maximum among {WebAssign average, Midterm grades, Final Exam grade} = 10%
- Maximum among {Midterm 1, Midterm 2} = 24%
- Final Examination 66%

**Additional Notes.** I will be in my office April 11-14 to answer questions from approximately 9:30-3:00. I will be away April 15-18, so I will not be at the exam (I have asked some TAs to be available).

There will also be a review session:

Day: Fri. April 15  
 Room: BSB 136  
 Time: 3:30-5:30pm

If you have questions, please feel free to email me. Good luck!