

## MATH 242 MIDTERM 1 STUDY GUIDE

### How to prepare for this exam:

1. Look over all of your old homework. Make sure that what you wrote down still makes sense.
2. Redo all of your quizzes. Even if you did them perfectly, redoing them will remind you about the different types of problems.
3. Read over your notes. There are many subtleties that are important to understand. Once you understand these then you understand the material much better.
4. Look over the Review section at the end of chapters 13 and 14.

Format for the midterm: **Multiple choice** (please bring pencil #2).

You will not be able to use your notes, or book on the exam. You can use one note card  $3 \times 5$  inches with any formulas you wish.

### Review questions:

- Page 969: 2, 3, 5, 7, 8, 9, 13, 15, 21, 23, 24, 27, 29, 31, 33, 36;
- Page 1031: 1, 3, 5, 6, 11, 12, 13, 14.
- Assigned homework exercises

### Vocabulary:

- antiderivative
- indefinite integral
- power rule
- sum and difference rule
- constant multiple rule
- motion in a straight line
- substitution
- area under a curve
- left Riemann sum
- definite integral
- Fundamental Theorem of Calculus (FTC)
- FTC and substitution
- Integration by parts
- area between two curves

## 1. CHAPTER 13

Sections 13.1, 13.2, 13.3, 13.4. Here are some things you should know:

- You should know what an antiderivative and the indefinite integral are.
- You should be familiar with the following integration rules and techniques:

The power rule  $\int x^n = xdx = \frac{1}{n+1}x^{n+1} + C, n \neq -1, \int \frac{1}{x} = xdx = \ln(|x|) + C,$

The sum and difference rule  $\int (f + g)dx = \int fdx + \int gdx, \int (f - g)dx = \int fdx - \int gdx,$

The constant multiple rule  $\int (cf)dx = c \int fdx,$

$\int b^x dx = b^x \ln(b) + C, \int e^x dx = e^x + C,$

Substitution  $\int f(x)dx = \int \frac{f(x)}{u'} du.$

- You should know what the definite integral is (as the area under the curve, and as a limit of Riemann sums.
- You should be able to estimate the definite integral using Riemann sums.
- You should be able to calculate certain definite integrals using geometry.
- You should be able to calculate definite integrals using the Fundamental Theorem of Calculus.
- You should be familiar with the various applications of the definite and indefinite integral, including:
  - Finding (net) distance traveled given velocity
  - Finding the total amount of a quantity given the rate of change of that quantity
  - Finding the area under the curve

## 2. CHAPTER 14

Sections 4.1, 14.2. Here are some things you should know:

- You should be able to integrate by parts.
- You should be able to find the area between two curves, and the area of a region enclosed by curves.