MATH 2400, Review suggestions for the second midterm

Dear students,

The second midterm exam is on Monday, March 7 from from 5:15pm to 6:45pm in MATH 100. The exam covers Sections 10.5–12.3 of the textbook. Here are some suggestions for review of the material.

Spend some time on the Concept Check and True-False Quiz (pg. 822–823, 899-900) and the most time on the Exercises. Make sure you understand the formulas and theorems from the textbook highlighted in the red boxes. If you struggle with anything or need to look at the answer before you solve it, make sure you then practice more similar problems until you can do it on your own. Then practice with some of the old exams from the course web page.

Below is a list of typical problems from each section. The list is not meant to be exhaustive but if you master these tasks you should do well on the exam.

Chapter 10: Vector Functions

Section 10.5: Parametric Surfaces.

- Sketch and identify a parametric surface. **EXAMPLE 1** *pg. 731 #4, 6*
- Parametrize a given surface. **EXAMPLES 3–7** *pg. 732 #21, 23, 24*
- Parametrize a surface of revolution. **EXAMPLE 8**

Chapter 11: Partial Derivatives

Section 11.1: Functions of Several Variables.

- Find the domain and range, sketch the graph. **EXAMPLES 3, 4, 11** *pg. 746 #5, 8*
- Find the level curves (or level surfaces), draw a contour map. **EXAMPLES 7–9, 12** *pg. 746 #23, 26, 28*

Section 11.2: Limits and Continuity.

- Find a limit, if it exists, or show that it does not exist. 1 **EXAMPLES 1–5** *pg. 755 #6, 8, 12, 35*
- Decide if and where a function is continuous. 3 **EXAMPLES 6–9** *pg. 755 #31, 33*

Section 11.3: Partial Derivatives.

- Find the partial derivatives of a function. 1 2 3 4 Notation Rule for finding **EXAMPLES 1–5** *pg. 824 #13, 14*
- Compute higher order partial derivatives. Clairaut's Theorem **EXAMPLES 6, 7** *pg. 824 #20, 22*
- Decide if a function is a solution to a partial differential equation. **EXAMPLES 8, 9** *pg. 824 #23, 24*

Section 11.4: Tangent Planes and Linear Approximations.

- Tangent planes and normal lines to graphs of functions. 2 **EXAMPLE 1** *pg. 824 #25, 26*
- Linear approximation. 4 7 8 **EXAMPLE 2** *pg. 825 #33*
- Differentials. 10 **EXAMPLES 4–6** *pg. 825 #32, 34*
- Tangent planes and normal lines to parametric surfaces. **EXAMPLE 7** *pg. 824 #29, pg. 825 #31*

Section 11.5: The Chain Rule.

- The Chain Rule. 2 3 4 **EXAMPLES 1, 3–7** *pg. 825 #35–37, 39, 41*
- Implicit differentiation. 6 7 **EXAMPLES 8, 9** *pg. 825 #42*

Section 11.6: Directional Derivatives and the Gradient Vector.

- The directional derivative and the gradient vector. 2 3 8 9 **EXAMPLES 2–5** *pg. 825 #43, 45, 46*
- The maximum rate of change and the direction in which it occurs. 15 **EXAMPLES 6, 7** *pg. 825 #44, 47, 48*
- Tangent planes and normal lines to level surfaces. 19 **EXAMPLE 8** *pg. 801 #51–53*

Section 11.7: Maximum and Minimum Values.

- Find and classify critical points. 1 2 Second Derivatives Test **EXAMPLES 1–3** *pg. 825 #53, 54*
- Find absolute extremes on a closed, bounded set. 8 9 **EXAMPLE 7** *pg. 825 #55, 56*
- Applications. **EXAMPLES 5, 6**

Chapter 12: Multiple Integrals

Section 12.1: Double Integrals over Rectangles.

- The double integral and volume. 5 **EXAMPLES 1, 2**
- The midpoint rule, average value. 7 8 9 **EXAMPLE 3** *pg. 900 #1, 2*

Section 12.2: Iterated Integrals.

- Iterated integrals, computing double integrals by partial integration. 4 5 **EXAMPLES 1, 2, 3, 5** *pg. 900 #3, 4, 15*
- Using a double integral to compute volume. **EXAMPLE 4** *pg. 901 #29*

Section 12.3: Double Integrals over General Regions.

- Double integrals over type 1 and type 2 regions, choosing a better description. 3 5 **EXAMPLES 1–3** *pg. 900 #17, 19, 22 pg. 852 #54*
- Using a double integral to compute volume. **EXAMPLE 4** *pg. 901 #30, 32*
- Computing iterated integrals by reversing the order of integration. **EXAMPLE 5** *pg. 900 #13, 14*
- Properties of double integrals. 6–11 **EXAMPLE 6** *pg. 852 #55*