Review sheet for Exam 2

Be sure to practice the practice problems listed on the course web page. You should skip around and work on things that you find difficult or confusing first. While studying, try your best not to refer to your notes or the book so that you can better internalize the formulas and techniques.

Here are some problems from the chapter review section:

- Chapter 14 review: Think through the "concept check" and "true–false quiz". Also try 1-10, 13-17, 19-22, 25-29, 31, 33, 35-37, 42-48, 51-54

14.1: Functions of several variables

- Know the definition of a function of several variables and how to find their domains.

- Know the definition of the graph of a function of several variables.

- Be able to use level curves and traces to understand the graphs of functions of several variables.

14.2: Limits and continuity

- Understand the idea of what a limit is for a function of several variables.

- You *don't* need to know the specifics of definition 1 for the exam.

- Know how to show that limits do not exist.

- Be able to use the squeeze theorem to show that limits do exist.

- Know the definition of continuity. Remember that a function is continuous on its domain.

14.3: Partial derivatives

- Know the definition of partial derivatives and how to compute them.

- Understand the geometric meaning of partial derivatives.

- Know how the various notation for partial derivatives works.

- Know Clairaut's theorem.

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14.4: Tangent planes

- Know how to find the tangent plane at a point to a graph of a function of two variables.

- Understand how to interpret the tangent plane as a linear approximation and be able to use it to approximate the values of the function at nearby points.

- Know theorem 8. I won't bother you about definition 7 on the exam.

14.5: The chain rule

- Know the chain rule.

- Be able to do implicit differentiation with partial derivatives.

14.6: Directional derivatives and the gradient

- Know the definition of a directional derivative.

- If a function is differentiable, know how to compute the directional derivative using theorem 3.

- Understand the geometric meaning of directional derivatives.

- Know the definition of the gradient vector and understand its geometric properties.

- Be able to compute the tangent plane to a level surface of a function of three variables.

14.7: Maximum and minimum values

- Know how to find the critical points of a function of two variables.

- Know the second derivative test and be able to use it.

- Know how to find absolute maxima and minima.