Reading Assignment 6 (Due Friday 7/9/21 by 12:55 PM)

Basic learning objectives: These are the tasks you should be able to perform with reasonable fluency **when you arrive at our next class meeting**. Important new vocabulary words are indicated in italics.

1. Compute second-order partial derivatives using differentiation rules from single-variable calculus.
2. Interpret f_{xx}, f_{xy} and f_{yy} geometrically.
3. Estimate second partial derivatives using first partial derivatives and the symmetric difference quotient.
4. State the technical condition that is required for the existence of a tangent plane.
5. State the definition of the tangent plane to the graph a continuously differentiable function.

Advanced learning objectives: In addition to mastering the basic objectives, here are the tasks you should be able to perform **after class, with sufficient practice:**

1. Compute tangent planes for various functions.
2. Understand how to use the tangent plane as a "local linearization" of a function.
3. Approximate a function using a local linearization. In particular, approximate function values when given only a table of values or a contour diagram.
4. Understand the differentials dx, dy, df as measuring small changes in the quantities x, y and f. Describe a formula that related the differentials dx, dy to df.
5. Use differentials to measure the change in a function f as we move from a fixed point to a nearby point.

Directions: Read the following sections of the book:

- Sections 10.2.4 Optional: Complete Activity 10.2.6.
- All of Section 10.3.
- Section 10.4.1.

and complete the following tasks along the way. If an Activity is not listed, you do not need to complete it (although you are welcome to read it). Turn your write up in via gradescope. You do not need to write the questions down, as long as you clearly indicate the question number.

1. Preview Activity 10.3.1.

2. Activity 10.3.2.

3. Activity 10.3.3.

4. Activity 10.3.4.

5. After reading all of Section 10.3, write down several things you learned or still have questions about. I will not be lecturing on Section 10.3, but we will have a reading debrief so that you can ask some questions.

6. Preview Activity 10.4.1.