Reading 6 (Due Monday 7/8/24 by 12:55 PM)

Directions: Read the following sections of the book:

- Section 10.3.1.
- 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. Preview Activity 10.4.1.

4. Activity 10.4.2

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. Know what Clairauts theorem says.
3. State the technical condition that is required for the existence of a tangent plane.
4. State the definition of the tangent plane to the graph a continuously differentiable function. Find the equation of a tangent plane.

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. Interpret the meaning of second-order partial derivatives in context.
2. Interpret f_{xx}, f_{xy} and f_{yy} geometrically.
3. Estimate second-order partials using a table or a contour map.
4. Understand how to use the tangent plane as a "local linearization" or "linear approximation" of a function.
5. Approximate a function using a local linearization. In particular, approximate function values when given only a table of values or a contour diagram.
6. 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.
7. Use differentials to measure the change in a function f as we move from a fixed point to a nearby point.