Reading Assignment 1 (Due Wednesday 6/26/24 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. Define the *traces* of a function.

2. Compute traces of some simple examples of functions of two variables.

3. State the definition of a *vector* and understand how to represent vectors geometrically and algebraically.

4. Determine whether or not two vectors are equal.

5. Compute the *displacement* vector between two points and understand the meaning of a *position* vector associated to a point.

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. Read a contour map.

2. Use traces and level curves to understand the graph of a function. In particular, reconstruct a graph of a function given its traces and level curves.

3. Perform computations with vectors by utilizing the properties of vector addition and scalar multiplication.

4. Interpret geometrically the operations of addition and scalar multiplication of vectors, and understand the geometric meaning of the magnitude of a vector.

5. Derive a general formula for the magnitude of a vector. Describe the way the magnitude operator interacts with addition and scalar multiplication. Define and compute unit vectors.

Directions: Read the following sections of the text

- Section 9.1.1 - Section 9.1.3 (review if necessary, we covered the main ideas during class)

- Section 9.1.4

- Section 9.1.5

- Section 9.2.1

- Section 9.2.2

and 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. Complete Activity 9.1.6.

2. Write an equation that describes the level curves of the function $f(x,y) = \sqrt{x^2 + y^2}$ (use k as the constant). Draw the graph of this curve for various values of the constant $k \in \mathbb{R}$.

3. After reading Sections 9.1.1-9.1.5, write down three things you learned or still have questions about.

4. Complete Preview Activity 9.2.1.

5. Consider the points $A = (1, 0)$, $B = (2, 1)$, $C = (0, 1)$, and $D = (1, 2)$. Draw the position vectors $\overrightarrow{OA}$, $\overrightarrow{OB}$, $\overrightarrow{OC}$, and $\overrightarrow{OD}$.

6. What does it mean for two vectors to be equal? Are the displacement vectors $\overrightarrow{AB}$ and $\overrightarrow{CD}$ equal? Explain your reasoning.

7. After reading of Section 9.2.1-9.2.2, write down three things that you learned or that you still have questions about.

8. The final task is unrelated to the above reading. Watch Grit: the power of passion and perseverance and any **4** of the following videos:

- Make Mistakes — Michael Starbird (2:11 min)
- Productive Failure/Struggle Skateboard Video (1:46 min)
- Productive Failure/Struggle BMX Video (1:39 min)
- Michael Jordan Failure Commercial (0:32 min)
- Mindests: Fixed versus Growth (2:19 min)
- Growth Mindset Animation (3:50 min)
- KhanAcademy interview with Carol Dweck about growth mindset (3:06 min)
- Learning Like a Jungle Tiger (5:23 min)
- Ira Glass on the Creative Process (1:54 min).

Write a reflection that is at least 10 sentences long. Rather than reflecting on each video individually, try to reflect on growth mindset, productive failure, and grit, in general.