Math 203, Spring 2026 — Homework 1

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Due February 6 at 5:00 pm

Instructions. This problem set contains problems from Week 1 of class. The problem numbers refer to theh PDF version of our textbook, *Apex Calculus*, by Gregory Hartman.

Problem 1. Please do the following textbook problems:

- Section 10.2: 8, 10, 13, 14, 16, 18, 20, 22, 24

Problem 2. Let $P = (1, 0, 2)$, $Q = (3, 4, -1)$, and $\mathbf{v} = \overrightarrow{PQ}$.

a. Write $\mathbf{v}$ in component form.

b. Find the magnitude of $\mathbf{v}$.

c. Find the unit vector that points in the direction opposite of $\mathbf{v}$.

d. Find the vector of length 3 that points in the direction of $\mathbf{v}$.

Problem 3. Let $\mathbf{u} = \langle 1, 1, -1 \rangle$ and $\mathbf{v} = \langle 2, 1, 2 \rangle$.

a. If $\mathbf{u} = \overrightarrow{PQ}$ with basepoint $P = (2, 2, 2)$, what must Q be?

b. Find $\mathbf{u} + \mathbf{v}$ and $\mathbf{u} - \mathbf{v}$.

c. Explain whether $\mathbf{u} + \mathbf{v}$ and $\mathbf{u} - \mathbf{v}$ are parallel using algebra.

Problem 4. If you liked the problems above or want more practice, our textbook has more great problems. Many odd-numbered ones have solutions in the back. Here are some that I recommend (as optional, not to be turned in):

- Section 10.1: 2, 3, 11, 12, 13, 14
- Section 10.2: 2, 3, 5, 6, 7, 9, 11, 17, 19, 23, 25

Feel free to try others, including the problems in the main sections, which include full explanations.