Quiz #9, 4/4Math 157 (Calculus II), Spring 2025

Problem 1 is worth 2 points, Problem 2 is worth 5 points, and Problem 3 is worth 3 points, for a total of 10 points. Remember to *show your work* on all problems!

1. For each of the following sequences, state the value of the limit or state that it diverges.

(a)
$$\lim_{n \to \infty} \frac{3n^2 + 2n - 5}{7n^2 - 5n + 1}$$

(b)
$$\lim_{n \to \infty} \cos\left(\pi + \frac{\pi}{n}\right)$$

- 2. For each of the following sequences $\{a_n\}_{n=1}^{\infty}$, state whether it is: (i) increasing, decreasing, or neither; (ii) bounded, or unbounded; (iii) convergent or divergent.
 - (a) $a_n = n$
 - (b) $a_n = (-1)^n \cdot n$
 - (c) $a_n = \frac{3}{n}$ (d) $a_n = \frac{(-1)^n}{n}$ (e) $a_n = (-1)^n$
- 3. For each of the following series, state the value of the series or state that it diverges.

(a)
$$\sum_{n=1}^{\infty} \frac{1}{2^n}$$

(b)
$$\sum_{n=1}^{\infty} 3^n$$

(c)
$$\sum_{n=1}^{\infty} \frac{1}{n}$$