

Quiz #9, 4/4
Math 157 (Calculus II), Spring 2024

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) $\lim_{n \rightarrow \infty} \frac{3n^2 + 4}{2n^2 + 5n + 1}$

(b) $\lim_{n \rightarrow \infty} \sin\left(\frac{\pi}{2} + \frac{\pi}{n}\right)$

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) $a_n = n^2$

(b) $a_n = (-1)^n \cdot n^2$

(c) $a_n = \frac{1}{n}$

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

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