Math 252: Quiz 6 **22 October, 2026**

Name: _____ **/ 25**

30 minutes maximum. No aids (book, calculator, etc.) are permitted. Show all work and use proper notation for full credit. Answers should be in reasonably-simplified form. 25 points possible.

1. Consider the following series $\sum_{k=1}^{\infty} \left(\sqrt{k} - \sqrt{k+1}\right)$.

   (a) (2 points) Write out the first four partial sums.

   $S_1 =$

   $S_2 =$

   $S_3 =$

   $S_4 =$

   (b) (3 points) Write a formula for the nth partial sum.

   (c) (5 points) Determine whether the series converges or diverges. If the series converges, find its value.

2. (5 points) Determine whether the following series converges or diverges. If it converges, find its value.

$$\sum_{n=1}^{\infty} 500 \left(\frac{1}{5^n}\right)$$

3. For each of the following series, determine whether the series converges or diverges.

   (a) (4 points) $\displaystyle\sum_{n=5}^{\infty} 2^{(1/n)}$

   (b) (4 points) $\displaystyle\sum_{n=1}^{\infty} \frac{n}{1+n^2}$

   (c) (2 points) $\displaystyle\sum_{n=1}^{\infty} \frac{1}{n^4}$