Math 252: Quiz 8 **26 Mar 2026**

Name: _____ _____ / **25**

1. [12 points] Use the comparison test or the limit comparison test to determine if the series converges or diverges. A complete answer includes (i) which test you are using, (ii) a clear application of the test, and (iii) a conclusion drawn from the test.

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

b. $\displaystyle\sum_{n=1}^{\infty} \frac{1}{2n-3}$

c. $\displaystyle\sum_{n=1}^{\infty} \frac{3^n}{5^n - 4^n}$

2. [12 points] Do the series converge absolutely, conditionally, or neither (diverge)? A complete answer includes (i) which test(s) you are using, (ii) a clear application of the test(s), and (iii) a circled answer.

a. $\displaystyle\sum_{n=1}^{\infty} \frac{(-1)^{n+1} n}{2n+1}$

CONVERGES ABSOLUTELY | CONVERGES CONDITIONALLY | DIVERGES

b. $\displaystyle\sum_{n=1}^{\infty} \frac{(-1)^n \ln(n)}{n^2}$

CONVERGES ABSOLUTELY | CONVERGES CONDITIONALLY | DIVERGES

c. $\displaystyle\sum_{n=1}^{\infty} \frac{(-1)^n}{n^{2/3}}$

CONVERGES ABSOLUTELY	CONVERGES CONDITIONALLY	DIVERGES

3. [1 points] The sum of the convergent series $S = \displaystyle\sum_{n=1}^{\infty} \frac{(-1)^{n+1}}{n+\sqrt{n}}$ is estimated by its 15th partial sum $S_{15} = \displaystyle\sum_{n=1}^{15} \frac{(-1)^{n+1}}{n+\sqrt{n}} \approx 0.3523$. Estimate how close S_{15} is to the sum of the series $S = \displaystyle\sum_{n=1}^{\infty} \frac{(-1)^{n+1}}{n+\sqrt{n}}$.