Math 252: Quiz 9 **9 Nov 2023**

Name: _____ **/ 25**

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

1. [5 points] Use the limit comparison test to determine whether the series $\sum_{n=0}^{\infty} \frac{3n+1}{(n+2)10^n}$ converges or diverges.

series to use as a comparison:

application of the limit comparison test:

conclusion:

2. [6 points] Show that the series $\displaystyle\sum_{n=1}^{\infty} \frac{(-1)^n}{n+\sqrt{n}}$ is conditionally convergent.

a. Show $\displaystyle\sum_{n=1}^{\infty} \frac{(-1)^n}{n+\sqrt{n}}$ is not absolutely convergent.

name of test:

application of the test:

b. Show that $\displaystyle\sum_{n=1}^{\infty} \frac{(-1)^n}{n+\sqrt{n}}$ is convergent.

name of test:

application of the test:

3. [10 points] For each series below, use either the ratio test or the root test to determine whether the series converges or diverges.

a. $\displaystyle\sum_{n=1}^{\infty} \frac{3^n}{n!}$

name of test:

application of the test:

conclusion:

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

name of test:

application of the test:

conclusion:

4. [5 points] Find the radius of convergence, R, and the interval of convergence for the power series

$$\sum_{n=1}^{\infty} 2\left(\frac{x}{3}\right)^n.$$

a. Find R.

name of test:

applying the test:

b. Check the endpoints, if any.

c. Answer: $R =$, interval of convergence: