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. [9 points] Do the series converge absolutely, conditionally, or neither (diverge)? Show your work and circle one answer.

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

CONVERGES ABSOLUTELY

CONVERGES CONDITIONALLY

DIVERGES

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

DIVERGES

c.
$$\sum_{n=1}^{\infty} \frac{\cos(\pi n)}{\sqrt{n}}$$

CONVERGES ABSOLUTELY CONVERGES CONDITIONALLY

DIVERGES

Math 252: Quiz 9

2. [6 points] Use the ratio or root test to determine whether the series converges or diverges. Show your work.

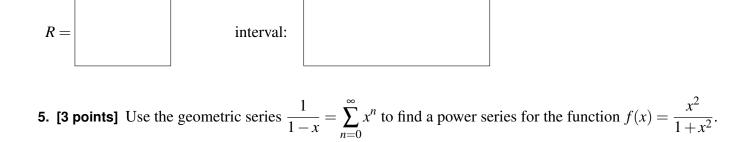
a.
$$\sum_{k=1}^{\infty} \frac{k^3}{3^k}$$

b.
$$\sum_{n=1}^{\infty} \frac{(n+2)^2}{n!}$$

3. [3 points] How close is the partial sum $S_{10} = \sum_{n=1}^{10} \frac{(-1)^n}{2n+1}$ to the convergent infinite sum (series) $\sum_{n=1}^{\infty} \frac{(-1)^n}{2n+1}$? That is, how large is the remainder R_{10} ? Give a brief explanation, and then answer quantitatively in the box, using the fact that the series is alternating.

Math 252: Quiz 9

4. [4 points] Find the radius and interval of convergence of the power series $\sum_{n=1}^{\infty} \frac{(2x)^n}{n}$. Show your work.



Math 252: Quiz 9

Extra Credit. [2 points] Explain why $\sum_{n=1}^{\infty} (-1)^n \sin\left(\frac{1}{n}\right)$ converges conditionally.

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