Quiz 8 Name: Key

Math 201 F01 03/27/12

Determine whether the following series converge or diverge, using any appropriate method (computation of partial sums, nth term test, integral test, direct comparison test, limit comparison test, alternating series test, ratio test). State which method you are using, and show enough work to indicate that you have checked any needed conditions.

1. $\sum_{n=1}^{\infty} \frac{n^2}{3^n}$ Ratio Test $\left|\frac{a_{n+1}}{a_n}\right| = \frac{(n+1)^2}{3^{n+1}} \cdot \frac{3^n}{n^2} = \frac{1}{3}\left(\frac{n+1}{n}\right)^2 \to \frac{1}{3}$ as $n \to \infty$

Series Converges

2. $\sum_{n=1}^{\infty} \frac{(-1)^{n+1}}{\sqrt{n^2+1}}$ Alternating Series Test

$\frac{1}{\sqrt{(n+1)^2+1}} \leq \frac{1}{\sqrt{n^2+1}}$ Since denominator grows with n

$\lim_{n\to\infty} \frac{1}{\sqrt{n^2+1}} = 0$

Series Converges