

PRINT Your Name: _____

Quiz 10 — November 4, 2013 — Section 2 — 4:40 — 5:30

Remove everything from your desk except a pencil or pen.

Write in complete sentences. Explain your work!

The quiz is worth 5 points.

Does the series $\sum_{n+1}^{\infty} \frac{2+(-1)^n}{n\sqrt{n}}$ converge? Justify your answer very thoroughly. Write in complete sentences.

Answer: We observe that $\frac{1}{n^{3/2}} \leq \frac{2+(-1)^n}{n\sqrt{n}} \leq \frac{3}{n^{3/2}}$. The inequality on the left ensures that $\sum_{n+1}^{\infty} \frac{2+(-1)^n}{n\sqrt{n}}$ is a series of positive numbers and we are able to use the Comparison Test. We use the inequality on the right for our comparison. The series $\sum_{n+1}^{\infty} \frac{3}{n^{3/2}}$ is 3 times the p -series with $p = 3/2 > 1$; thus the p -series $\sum_{n+1}^{\infty} \frac{1}{n^{3/2}}$ converges. Any constant times a convergent series is also convergent; hence $\sum_{n+1}^{\infty} \frac{3}{n^{3/2}}$ also converges. The Comparison Test now guarantees that the series $\sum_{n+1}^{\infty} \frac{2+(-1)^n}{n\sqrt{n}}$ also converges.