

## COMPARISON TESTS QUIZ

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Name: Solutions

1. Use either the Comparison Test or the Limit Comparison Test to decide whether the series

$$\sum_{n=1}^{\infty} \frac{n+1}{n^2\sqrt{n}}$$

converges or diverges. Justify your answer.

This series converges by Limit Comparison with the convergent p-series  $\sum_{n=1}^{\infty} \frac{1}{n^{3/2}}$ :

$$\lim_{n \rightarrow \infty} \frac{n+1}{n^2\sqrt{n}} / \left(\frac{1}{n^{3/2}}\right) = \lim_{n \rightarrow \infty} \frac{(n+1)n\sqrt{n}}{n^2\sqrt{n}}$$

$$= \lim_{n \rightarrow \infty} \frac{n^2+n}{n^2}$$

$$\stackrel{L'H}{=} \lim_{n \rightarrow \infty} \frac{2n+1}{2n}$$

$$\stackrel{L'H}{=} \lim_{n \rightarrow \infty} \frac{2}{2} = 1 > 0.$$