INTEGRAL TEST QUIZ

BLAKE FARMAN

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Name: Solutions

1. Use the **Integral Test** to determine whether the series $\sum_{n=1}^{\infty} \frac{1}{n^2+1}$ converges or diverges.

$$\int_1^{\infty} \frac{1}{x^2+1}\,dx = \lim_{t\to\infty} \int_1^{t} \frac{1}{x^2+1}\,dx$$

$$= \lim_{t\to\infty} \arctan(x)\Big|_1^t$$

$$= \lim_{t\to\infty} \arctan(t) - \arctan(1)$$

$$= \frac{\pi}{2} - \frac{\pi}{4}$$

$$= \frac{\pi}{4}$$

Therefore $\sum_{n=1}^{\infty} \frac{1}{n^2+1}$ converges by the Integral Test.