

Daily Quiz

- Go to [Socrative.com](https://www.socrative.com) and complete the quiz.
- Room Name: HONG5824
- Use your full name.

8.3 Direct Comparison Test

Direct Comparison Test.

Suppose $\sum_{n=1}^{\infty} a_n$ and $\sum_{n=1}^{\infty} b_n$ are series with $0 \leq a_n \leq b_n$ for all n . Then

$$0 \leq \sum_{n=1}^{\infty} a_n \leq \sum_{n=1}^{\infty} b_n$$

and

(a) If $\sum_{n=1}^{\infty} b_n$ converges, then $\sum_{n=1}^{\infty} a_n$ converges.

(b) If $\sum_{n=1}^{\infty} a_n$ diverges, then $\sum_{n=1}^{\infty} b_n$ diverges.

To use either the Direct Comparison Test or the Limit Comparison Test, we need to compare our messy-looking series to another series that we already understand. Below are the series that we understand so far:

1. A geometric series (a and r are constants)

$$\sum_{n=0}^{\infty} ar^n$$

2. A p -series (p is a constant)

$$\sum_{n=1}^{\infty} \frac{1}{n^p}$$

3. A series that looks similar to an improper integral that can be solved using u-sub or other integration techniques

$$\sum_{n=2}^{\infty} \frac{1}{n \ln n} \approx \int_2^{\infty} \frac{1}{x \ln x} dx$$

8.3 Direct Comparison Test

Test the series $\sum_{n=1}^{\infty} \frac{1}{2^n - 1}$ for convergence or divergence.

8.3 Direct Comparison Test

Determine whether the series $\sum_{n=1}^{\infty} \frac{5}{2n^2 + 4n + 3}$ converges or diverges.