Limit Comparison Test This is one of the most useful tests for determining convergence. Suppose $a_n > 0$ and $b_n > 0$ for all $n > N$ where N is a positive integer.

- If $\lim_{n \to \infty} \dfrac{a_n}{b_n} = c$, $0 < c < \infty$,
  then $\sum a_n$ and $\sum b_n$ behave the same.

- If $\lim_{n \to \infty} \dfrac{a_n}{b_n} = 0$, and b_n converges,
  then $\sum a_n$ converges.

- If $\lim_{n \to \infty} \dfrac{a_n}{b_n} = \infty$, and b_n diverges,
  then $\sum a_n$ diverges.

1.
$$\sum_{n=1}^{\infty} \frac{3n+2}{(n+1)^2}$$

2.
$$\sum_{n=1}^{\infty} \frac{1}{2^2 - 1}$$

3.
$$\sum_{n=1}^{\infty} \frac{2n+1}{n^3 - 2n}$$