

- There may be more than one test that will work.
- These are guidelines, not absolute rules.
- The tests don't find the sum of the series, they just tell you if the series is convergent/divergent.
- Practice is how to get good at this.

Is $\sum a_n$ a p -series or a geometric series?

$\xrightarrow{\text{Yes}}$

Use p -series result:

$\sum_{n=1}^{\infty} \frac{1}{n^p}$ converges if $p > 1$. Diverges otherwise.

Use geometric series result:

$\sum_{n=1}^{\infty} r^{n-1} = \frac{1}{1-r}$ if $|r| < 1$. Diverges otherwise.

Is it obvious that $\lim_{n \rightarrow \infty} a_n \neq 0$?

$\xrightarrow{\text{Yes}}$

Try the Test for Divergence.

Is $\sum a_n$ like a p -series or geometric series, and has positive terms?

$\xrightarrow{\text{Yes}}$

Try Limit Comparison Test or Comparison Test.

Is a_n a rational function, or involves roots of polynomials?

$\xrightarrow{\text{Yes}}$

Try Limit Comparison Test or Comparison Test.

Is $\sum a_n$ an alternating series?

$\xrightarrow{\text{Yes}}$

Try Alternating Series Test.

Does a_n have factorials or constants raised to the n^{th} power?

$\xrightarrow{\text{Yes}}$

Try Ratio Test.

Does $a_n = (b_n)^n$?

$\xrightarrow{\text{Yes}}$

Try Root Test.

Is $a_n = f(n)$ where $f(x)$ is continuous, positive, and decreasing and $\int_1^{\infty} f(x) dx$ can be easily evaluated?

$\xrightarrow{\text{Yes}}$

Try Integral Test.