



Week in Review

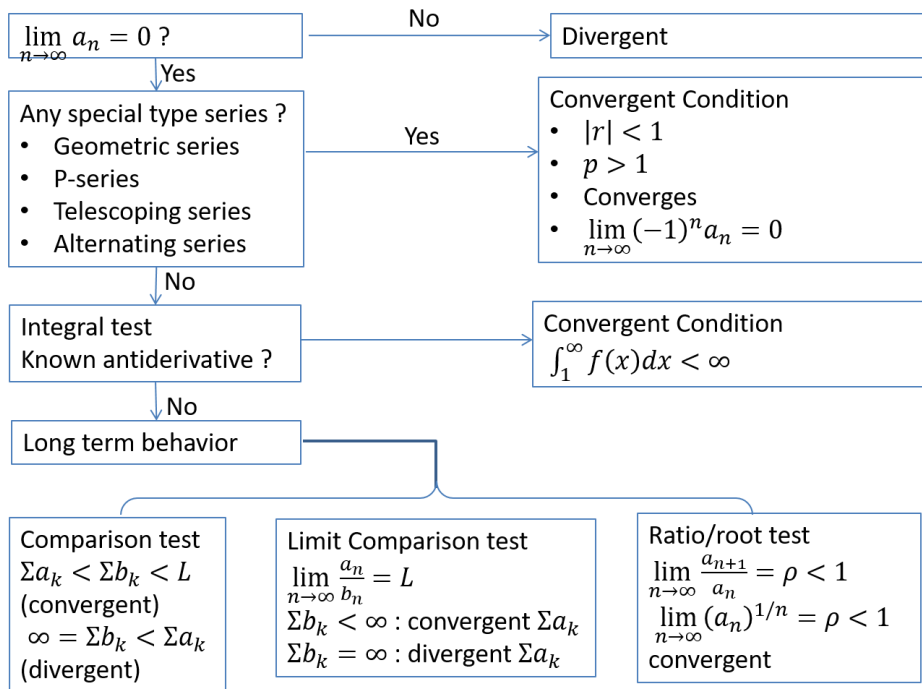
Math 152

Week 09

Comparison Test
Alternating Series



Review



For each of the following series, use the sequence of partial sums to determine whether the series converges or diverges.

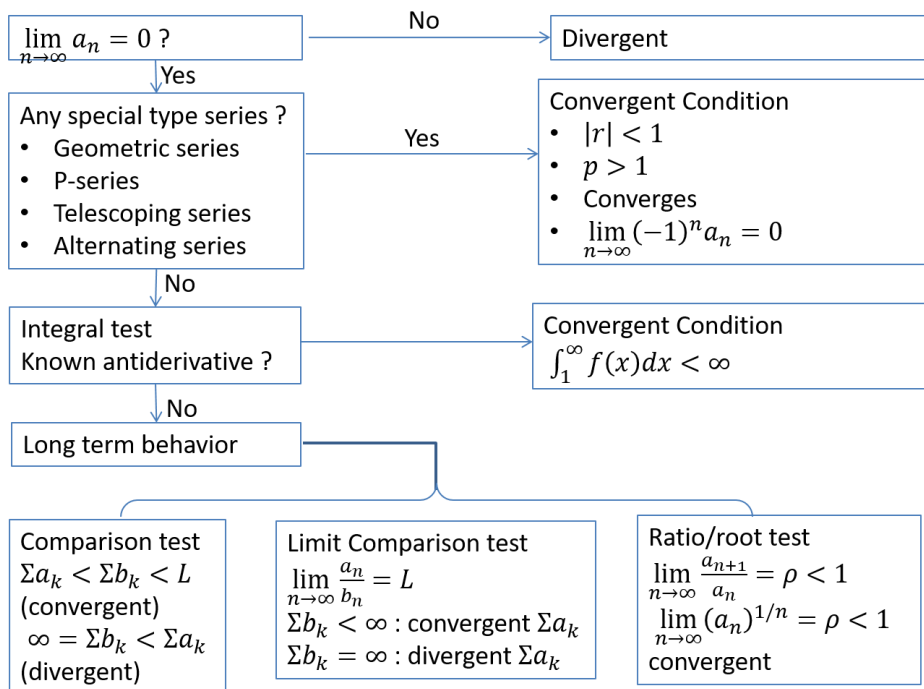
a.
$$\sum_{n=1}^{\infty} \frac{n}{n+1}$$

b.
$$\sum_{n=1}^{\infty} (-1)^n$$

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



Review



For each of the following series, apply the divergence test. If the divergence test proves that the series diverges, state so. Otherwise, indicate that the divergence test is inconclusive.

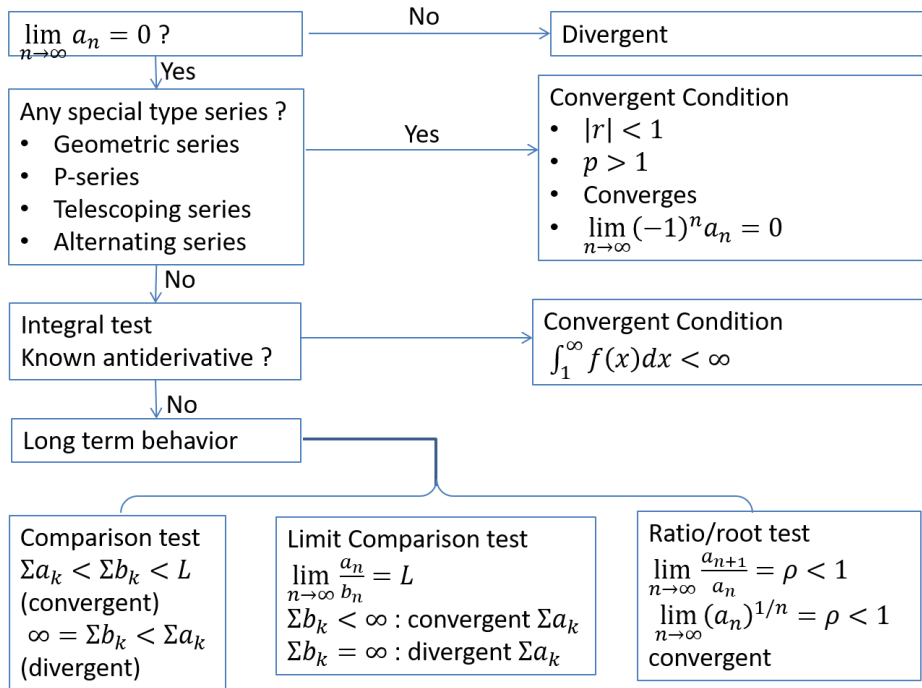
a. $\sum_{n=1}^{\infty} \frac{n}{3n-1}$

b. $\sum_{n=1}^{\infty} \frac{1}{n^3}$

c. $\sum_{n=1}^{\infty} e^{1/n^2}$



Review

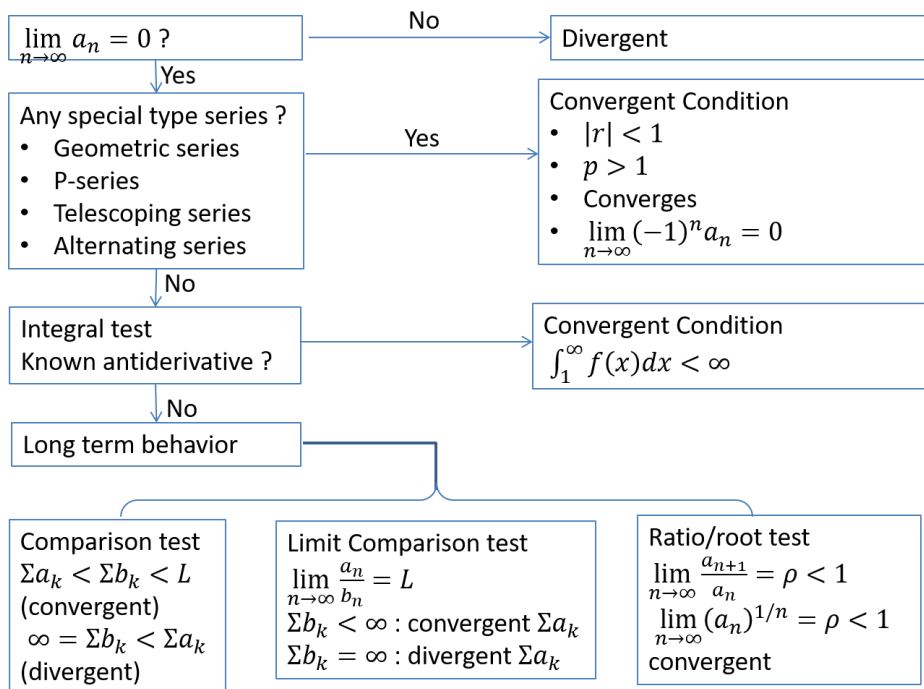


Determine whether the series

$$\sum_{n=1}^{\infty} (n+1)/n \text{ converges or diverges.}$$



Review

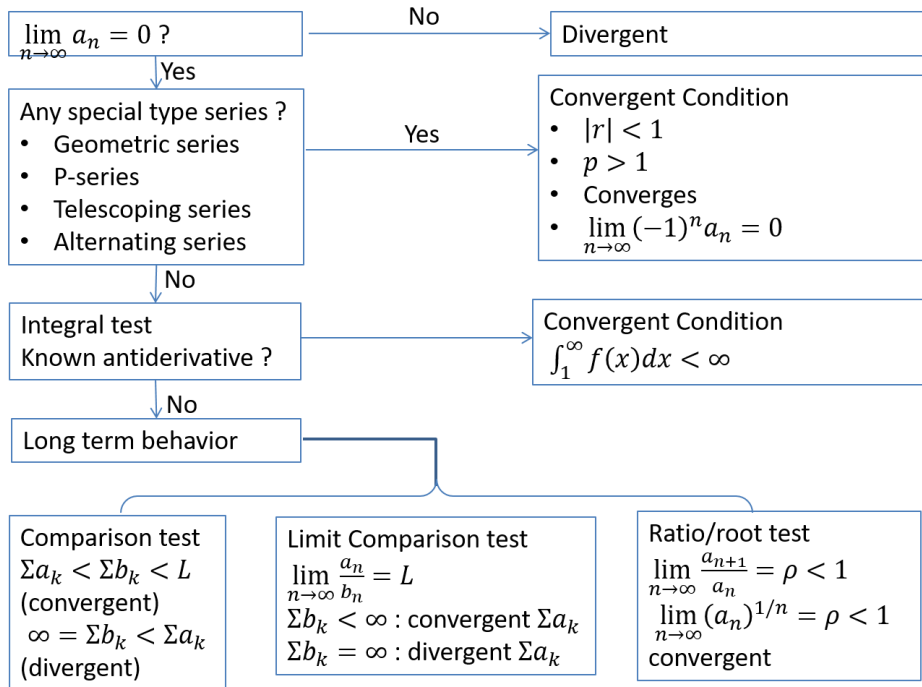


Determine whether the telescoping series converges or diverges.

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



Review

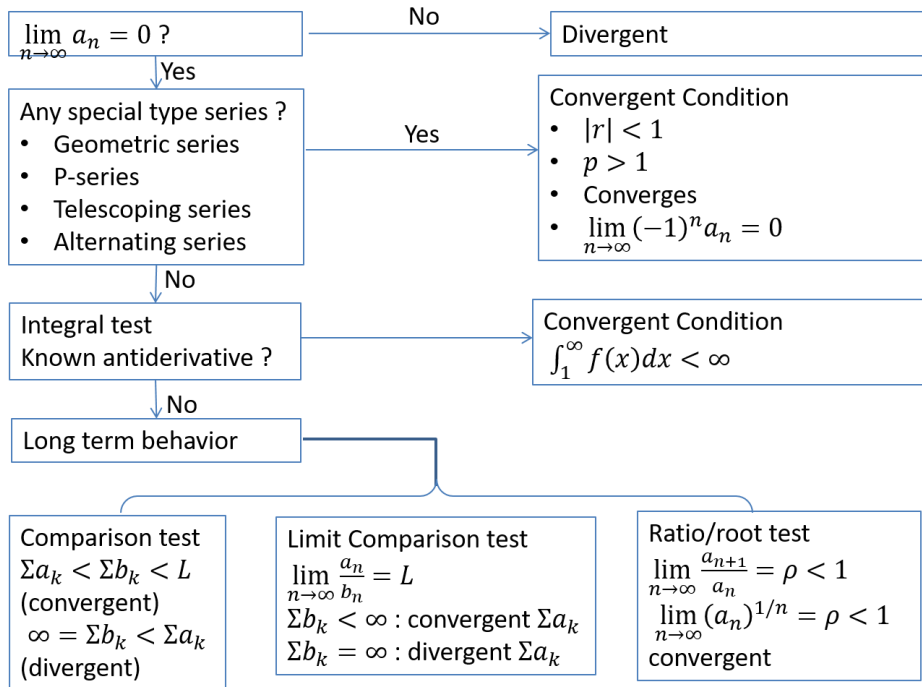


Evaluate

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



Review



Evaluate

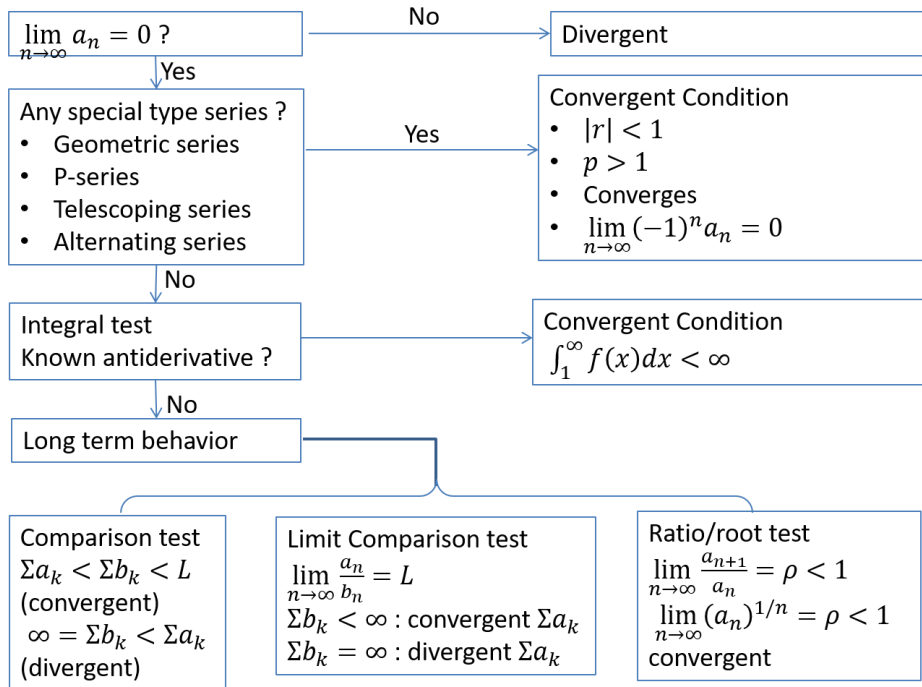
$$\sum_{n=1}^{\infty} \left(\frac{1}{2}\right)^{n-2}$$

Evaluate

$$\sum_{n=1}^{\infty} \frac{5}{2^{n-1}}$$



Review



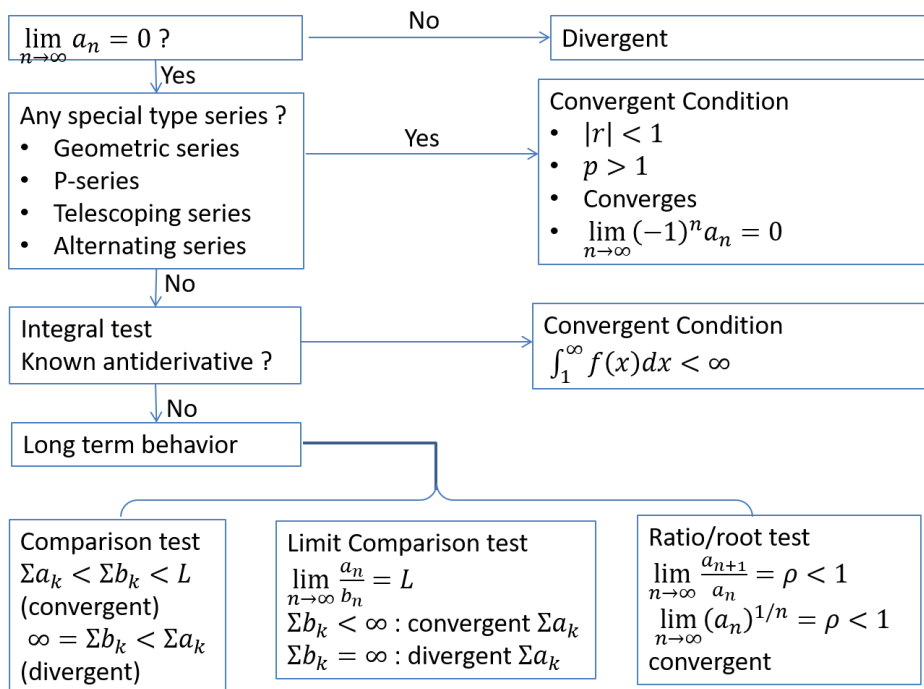
Determine whether each of the following geometric series converges or diverges, and if it converges, find its sum.

a.
$$\sum_{n=1}^{\infty} \frac{(-3)^{n+1}}{4^{n-1}}$$

b.
$$\sum_{n=1}^{\infty} e^{2n}$$



Review



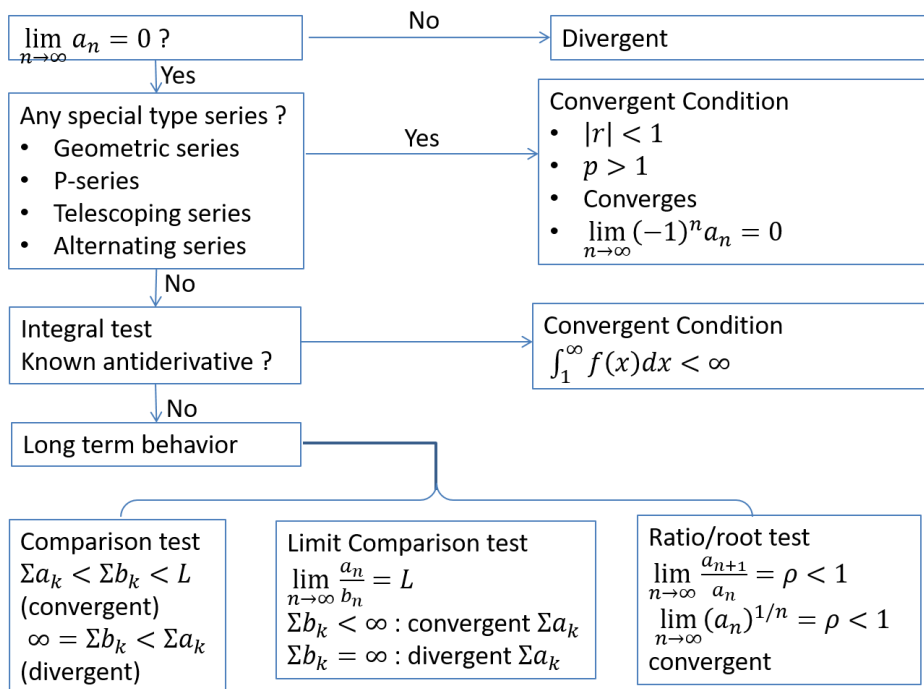
Determine whether the telescoping series

$$\sum_{n=1}^{\infty} [e^{1/n} - e^{1/(n+1)}]$$

converges or diverges. If it converges, find its sum.



Review



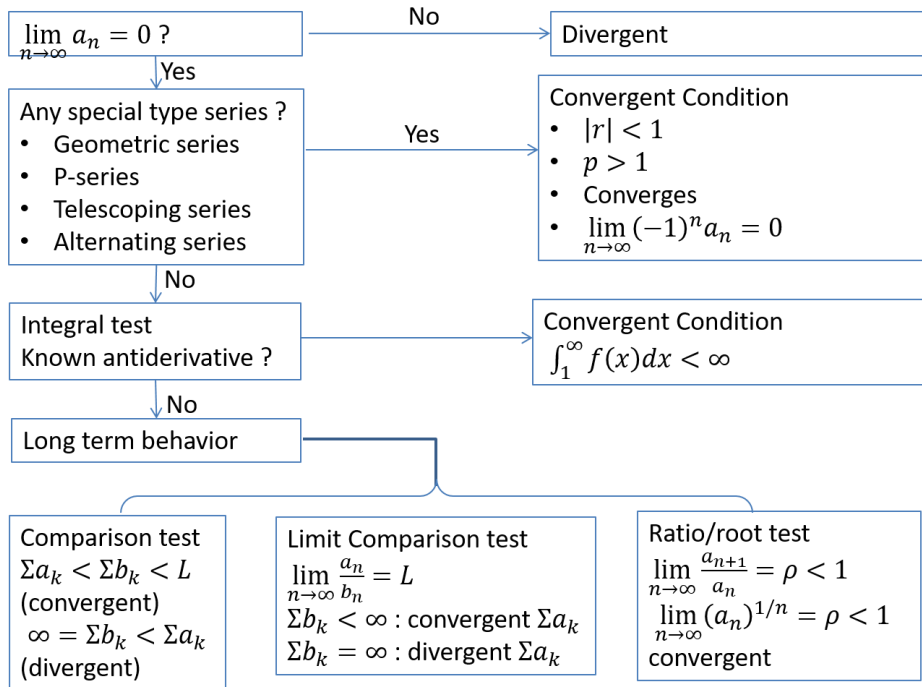
Determine whether the telescoping series

$$\sum_{n=1}^{\infty} \left[\cos\left(\frac{1}{n}\right) - \cos\left(\frac{1}{n+1}\right) \right]$$

converges or diverges. If it converges, find its sum.



Review



For each of the following alternating series, determine whether the series converges or diverges.

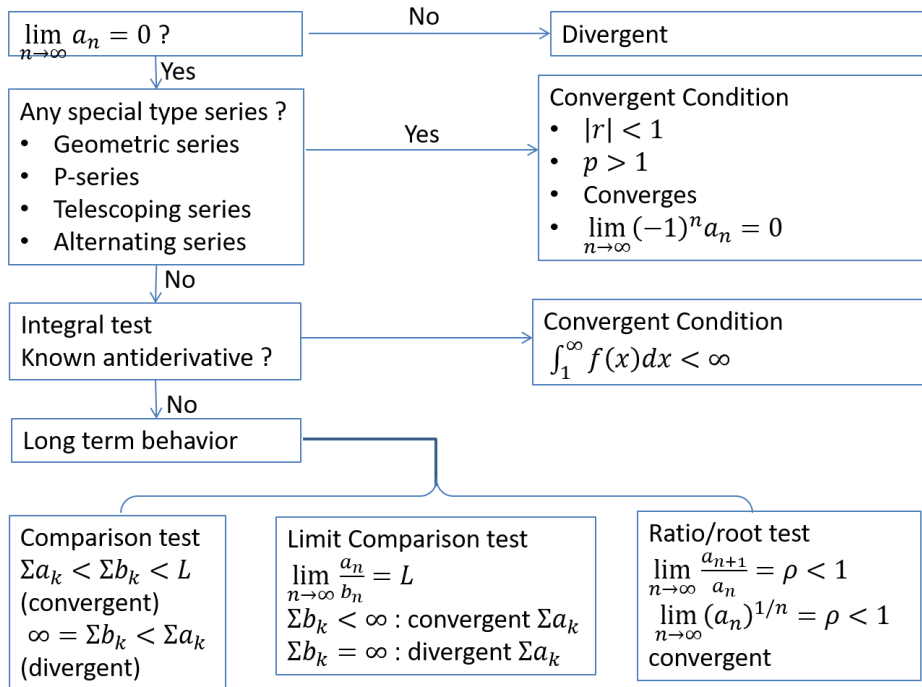
a. $\sum_{n=1}^{\infty} (-1)^{n+1} / n^2$

b. $\sum_{n=1}^{\infty} (-1)^{n+1} n / (n + 1)$

c. $\sum_{n=1}^{\infty} (-1)^{n+1} n / 2^n$



Review



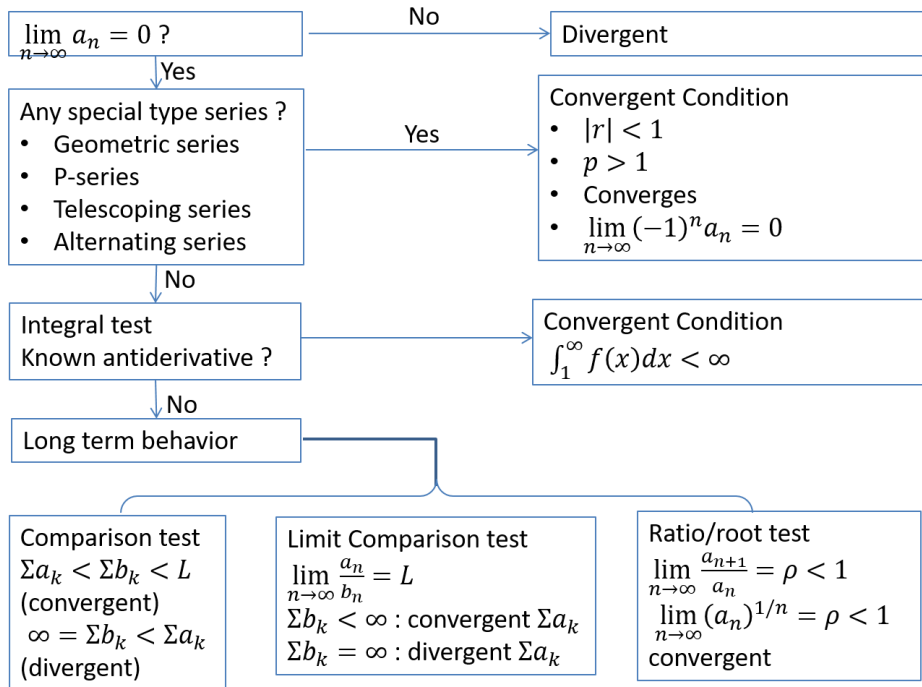
For each of the following series, determine whether the series converges or diverges.

a. $\sum_{n=1}^{\infty} 1/n^3$

b. $\sum_{n=1}^{\infty} 1/\sqrt{2n-1}$



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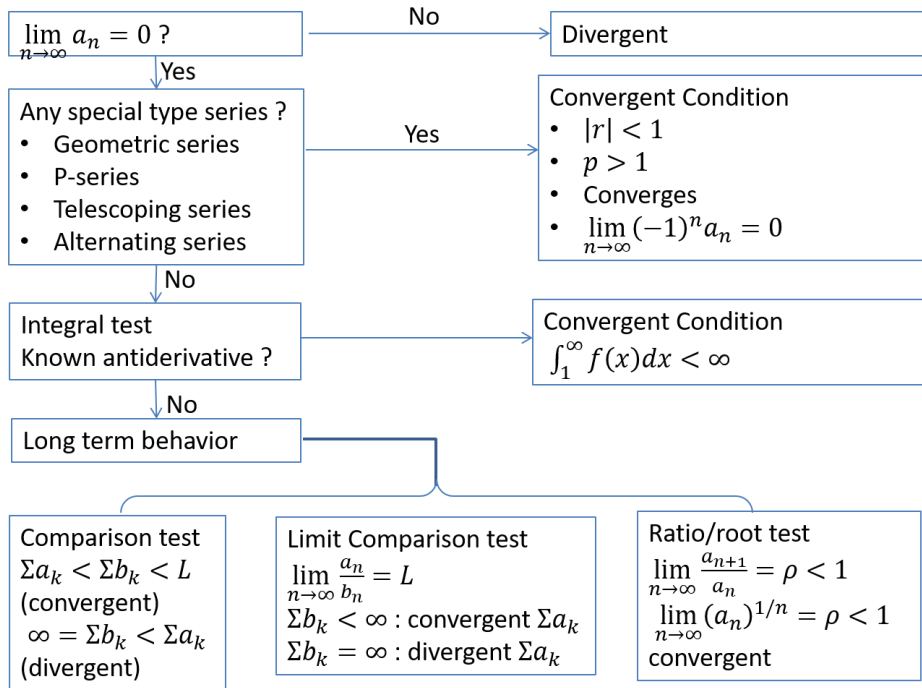


Use the integral test to determine whether

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



Review



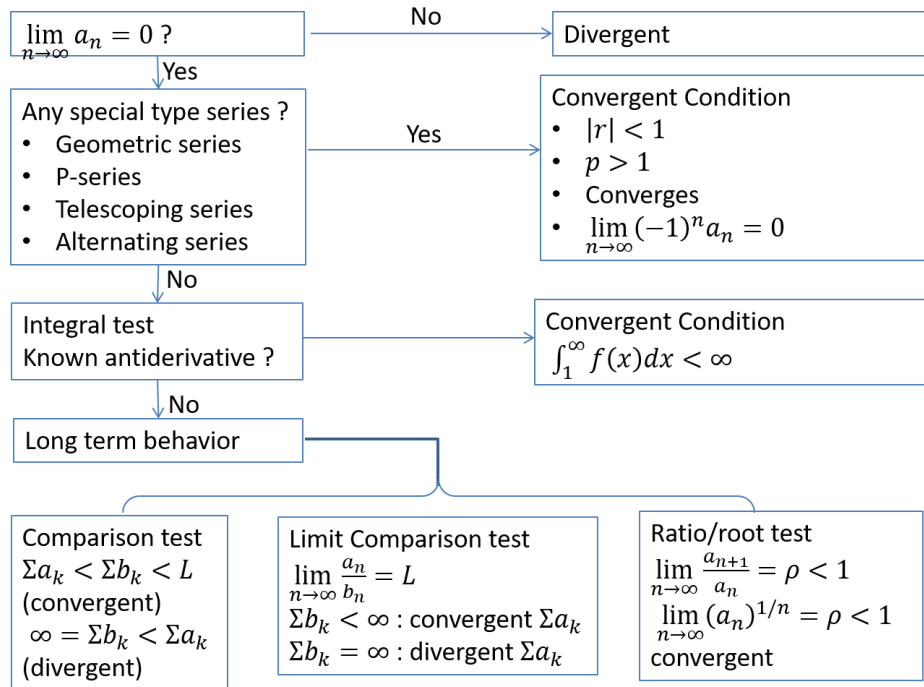
For each of the following series, determine whether it converges or diverges.

a. $\sum_{n=1}^{\infty} \frac{1}{n^4}$

b. $\sum_{n=1}^{\infty} \frac{1}{n^{2/3}}$



Review



For each of the following series, use the comparison test to determine whether the series converges or diverges.

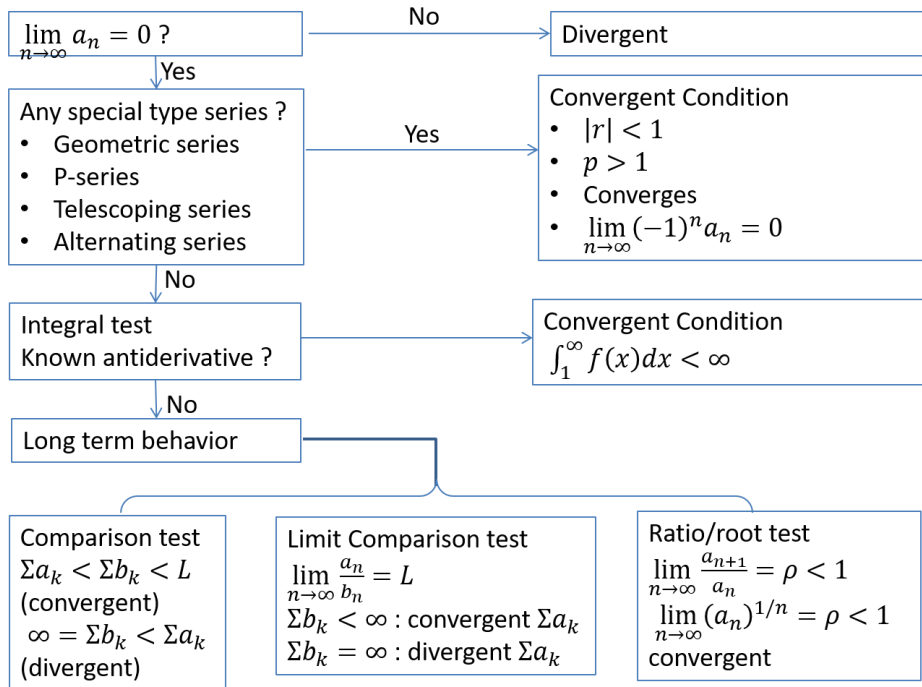
a. $\sum_{n=1}^{\infty} \frac{1}{n^3+3n+1}$

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

c. $\sum_{n=2}^{\infty} \frac{1}{\ln(n)}$



Review

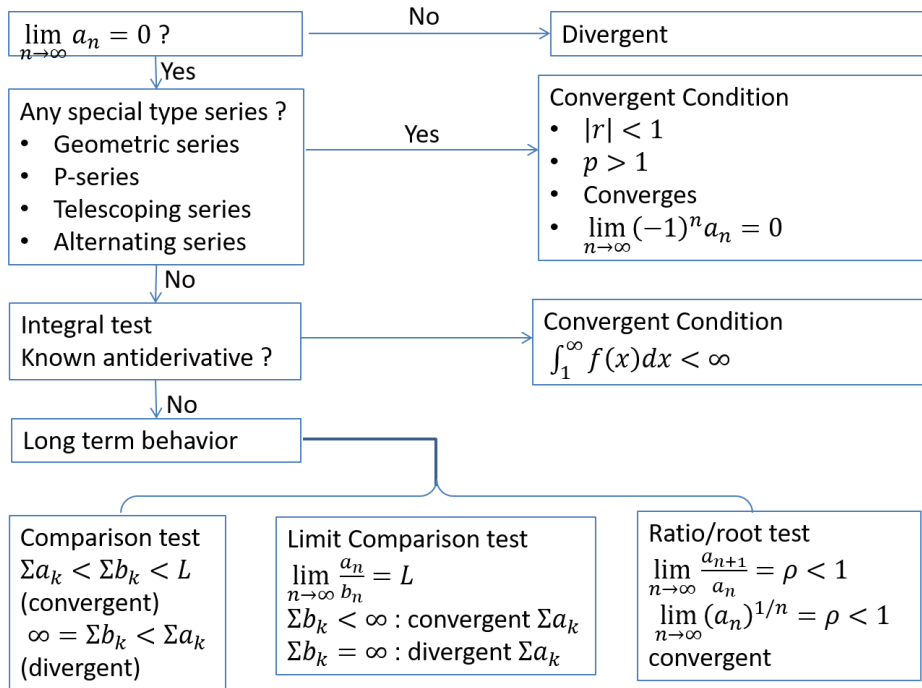


For each of the following series, use the limit comparison test to determine whether the series converges or diverges.

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



Review



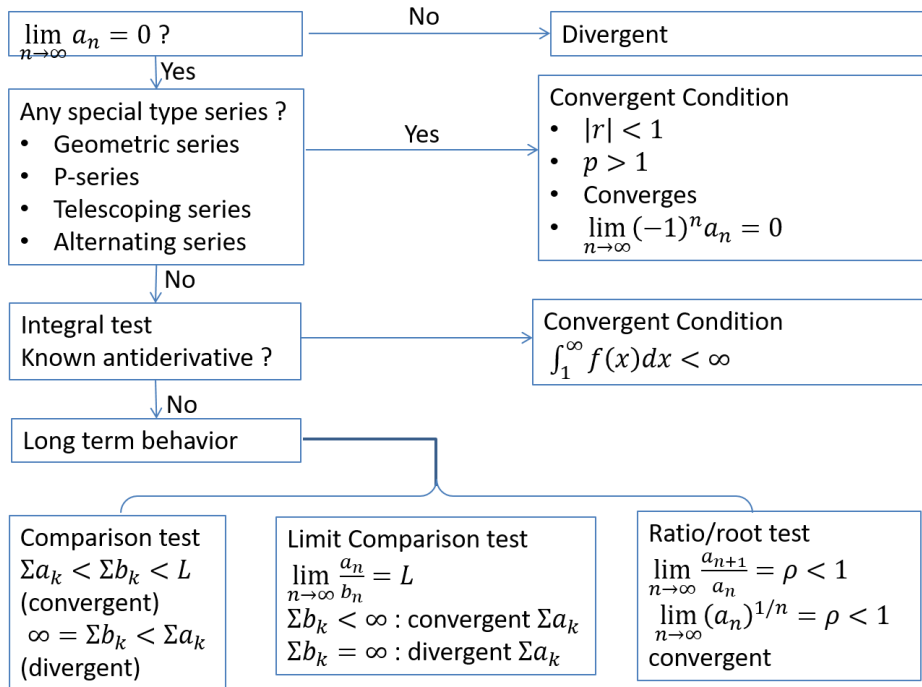
For each of the following series, determine whether the series converges or diverges.

- $\sum_{n=1}^{\infty} \frac{2^n}{n!}$
- $\sum_{n=1}^{\infty} \frac{n^n}{n!}$
- $\sum_{n=1}^{\infty} \frac{(-1)^n (n!)^2}{(2n)!}$

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



Review



For each of the following series, determine whether the series converges or diverges.

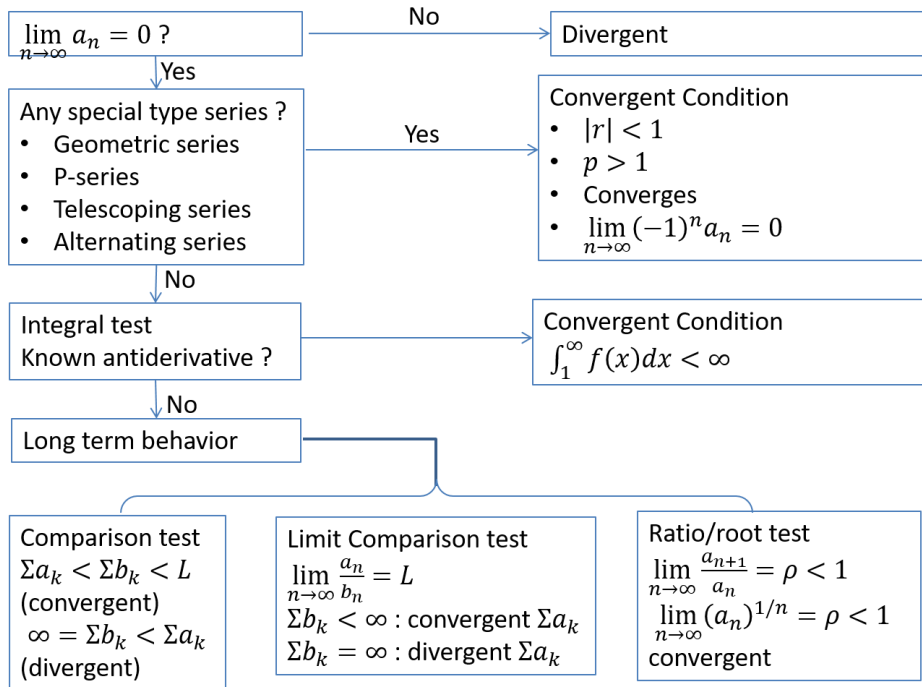
a. $\sum_{n=1}^{\infty} \frac{(n^2+3n)^n}{(4n^2+5)^n}$

b. $\sum_{n=2}^{\infty} \frac{n^n}{(\ln(n))^n}$

Determine whether the series $\sum_{n=1}^{\infty} 1/n^n$ converges or diverges.



Review



Determine whether the series converges or diverges.

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