

Recall:**Goals:** Be able to :

1. determine whether a series $\sum a_k$ converges or diverges.
2. If it converges, find the limit (that is, the value of the series) exactly, if possible.
3. If it converges but we can't find the limit exactly, be able to approximate it.

Simplifying Assumption:

Assume $a_k \geq 0$ for all $k \geq 0$.

Then

$\{S_n\}$ is an increasing sequence, so either

- The series converges
- The series blows up to ∞

Note: This doesn't hold if we allow negative terms. e.g.

$$\sum_{k=0}^{\infty} (-1)^k$$

Determine the convergence or divergence of the following three series:

$$1. \sum_{k=2}^{\infty} \frac{3^k}{5^k + 2k}$$

$$2. \sum_{k=2}^{\infty} \frac{2k}{7k + 18}$$

$$3. \sum_{j=5}^{\infty} \frac{j!}{(j+2)!}$$