Geometric Series Jamboard Example

Determine whether each series is a geometric series or p-series.
Then determine whether each series converges or diverges.

p-series

Converges

$$\sum_{n=1}^{\infty} 10\left(\frac{1}{2}\right)^{n}$$

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

$$\sum_{k=1}^{\infty} k^{1-\pi}$$

$$\sum_{n=0}^{\infty}\left(-\frac{e}{\pi}\right)^{n}$$

$$\sum_{n=2}^{\infty} n^{-\pi/3}$$

$$\sum_{k=1}^{\infty} k^{-0.8}$$

$$\sum_{n=1}^{\infty}\left(\frac{3}{2}\right)^{n}$$

$$\sum_{k=1}^{\infty} \frac{1}{\sqrt[4]{k^{3}}}$$

Geometric Series
$$\sum_{n=1}^{\infty} ar^{n-1}$$
• If $|r| < 1$, then the series converges to $\frac{a}{1-r}$. • If $|r| \geq 1$, then the series diverges.

p-series
$$\sum_{n=1}^{\infty} \frac{1}{n^{p}}$$
• If $p > 1$, then the series converges. • If $0 < p \leq 1$, then the series diverges.