

Example: n th-Term Test for Divergence

Verify that the infinite series $\sum_{n=1}^{\infty} \frac{n}{7n+2}$ and $\sum_{n=1}^{\infty} \frac{e^n}{n}$ diverges.

Geometric Series

The series $\sum_{n=0}^{\infty} ar^n = a + ar + ar^2 + \dots + ar^n + \dots$ is a **geometric series** with initial term a , $a \neq 0$ and ratio r , $r \neq 0$.

THEOREM CONVERGENCE OF A GEOMETRIC SERIES

A geometric series with ratio r diverges if $|r| \geq 1$. If $0 < |r| < 1$, then the series converges to the sum

$$\sum_{n=0}^{\infty} ar^n = \frac{a}{1-r}, \quad 0 < |r| < 1.$$

Example: Geometric Series

Determine whether the infinite series $\sum_{n=0}^{\infty} \frac{5}{(-2)^n}$ and $\sum_{n=0}^{\infty} \frac{5^{n+1}}{2^n}$ converge.

For each infinite series that converges, find its sum.

Example: Geometric Series

Write the repeating decimal $1.\overline{35}$ as the ratio of two integers.