## Solution

Check convergence of $\sum_{n=1}^{\infty}(-1)^{n+1}\cdot 0.5^n$: converges

# Steps

$$\sum_{n=1}^{\infty}(-1)^{n+1}\cdot 0.5^n$$

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**Apply Alternating Series Test:** converges       *Hide Steps* ⊖

$$\sum_{n=1}^{\infty}(-1)^{n+1}\cdot 0.5^n$$

**Alternating Series Test:**

Suppose that for $a_n$, there exists an $N$ so that for all $n \geq N$

1. $a_n$ is positive and monotone decreasing
2. $\lim_{n\to\infty}a_n = 0$

Then the alternating series $\sum(-1)^n a_n$ and $\sum(-1)^{n-1}a_n$ both converge

$a_n = 0.5^n$

$a_n$ is positive and monotone decreasing from N = 1

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$\lim_{n\to\infty}\left(0.5^n\right) = 0$       *Hide Steps* ⊖

$\lim_{n\to\infty}\left(0.5^n\right)$

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Apply the common limit: $\lim_{x\to\infty}\left(a^x\right) = 0,\ 0 < a < 1$

$= 0$

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By the alternating series test criteria

$= $ converges

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$= $ converges