Notes: Alternating Series, Absolute Convergence, &
Conditional Convergence

Infinite Series Day 8

Alternating Series Test: The alternating series
$\sum(-1)^n a_n$, where a_n is a sequence with all positive
terms,

Converges: If a_n is decreasing and $\lim\limits_{n \to \infty} a_n = 0$

What does the Alternating Series test not tell us?

Determine whether the following series are convergent
or divergent. Justify your answer.

Example One:

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

Example Two:

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

Example Three:

$$\sum_{n=0}^{\infty} (-1)^n \frac{1}{n \ln(n)}$$

Check for
Geometric Series

↓

Check for
p-series

↓

Try the
Divergence Test

↓

No! ← Check for All → Yes!
Positive Terms

Try the Alternating   Try the
Series Test   Comparison Test

↓   ↓

Try the Absolute   Try the Limit
Convergence Test   Comparison Test

↓   ↓

Try the   ←   Try the
Ratio Test   Integral Test