

11-09

Note Title

11/9/2007

$$\sum_{n=1}^{\infty} \frac{(-3)^{n+1}}{2^{3n}} = \sum_{n=1}^{\infty} \frac{(-3)^2 (-3)^{n-1}}{(2^3)^n} = 9 \sum_{n=1}^{\infty} \frac{(-3)^{n-1}}{8 \cdot 8^{n-1}} = \frac{9}{8} \sum_{n=1}^{\infty} \left(-\frac{3}{8}\right)^{n-1}$$

geometric

$$\sum_{n=1}^{\infty} \sin(n^2)$$

As  $n \rightarrow \infty$ ,  $n^2 \rightarrow \infty$   
and  $\sin(n^2)$  takes values in  $[-1, 1]$  with  
increasing frequency.

Divergence Test

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

$$b_n = \frac{\ln n}{\sqrt{n}}$$

Alternating Series Test

$$\sum_{n=1}^{\infty} \frac{n^2-1}{\sqrt{n^6+4}}$$

Limit Comparison to  $\frac{n^2}{\sqrt{n^6}} = \frac{1}{n}$

Ex

$$\sum_{n=1}^{\infty} \frac{n}{e^n} \quad \text{Try Ratio Test (Integral Test OK too)}$$

$$\int_1^{\infty} x e^{-x} dx$$

Ex

$$\sum_{n=1}^{\infty} \frac{n}{e^{n^2}} \quad \text{Integral Test} \quad \int_1^{\infty} x e^{-x^2} dx$$