Math 132 Quiz
8 AM - 9 AM

1. Is the series
$$\sum_{n=1}^{\infty} \frac{2^{2n}+3^n}{n2^{2n}}$$
convergent or is it divergent? Justify

Comparison test:

$a_n = \frac{2^{2n}+3^n}{n2^{2n}} = \frac{1}{n}\left(\frac{2^{2n}+3^n}{2^{2n}}\right) = \frac{1}{n}\left(1+\frac{3^n}{2^{2n}}\right) > \frac{1}{n}$

Since $\sum_{n=1}^{\infty} \frac{1}{n}$ diverges and $a_n > \frac{1}{n}$, $\sum_{n=1}^{\infty} \frac{2^{2n}+3^n}{n \cdot 2^{2n}}$ diverges

2. Let
$$S = \sum_{n=1}^{\infty} (-1)^n \frac{1}{n^3} \qquad \text{and} \qquad S_N = \sum_{n=1}^{N} (-1)^n \frac{1}{n^3}.$$
For what N can you be sure that $|S - S_N| < 0.001$?

Need $|a_{N+1}| \leq \frac{1}{1000} = 0.001$

$\frac{1}{(N+1)^3} \leq \frac{1}{1000}$

$1000 \leq (N+1)^3$

$10 \leq N+1$

$9 \leq N$

With $N=9$, $|S - S_N| < |a_{N+1}| = a_{10} = \frac{1}{1000}$