

12/13/14

8. $\sum_{n=1}^{\infty} \frac{1}{\sqrt{n+4}}$ CONVERGES IF & ONLY IF $\int_1^{\infty} \frac{1}{\sqrt{x+4}} dx$ DOES

$\int_1^{\infty} \frac{1}{\sqrt{x+4}} dx = 2\sqrt{x+4} \Big|_1^{\infty}$ DIVERGES

9. $\sum_{n=1}^{\infty} \frac{n}{2n^3 + 1} \leq \sum_{n=1}^{\infty} \frac{n}{2n^3} = 2 \sum_{n=1}^{\infty} \frac{1}{n^2}$ CONVERGES
 BY p-SERIES TEST
 ($p=2$)

COMPARISON

10. $\sum_{n=2}^{\infty} \frac{n^3}{n^4 - 1} \geq \sum_{n=2}^{\infty} \frac{n^3}{n^4} = \sum_{n=2}^{\infty} \frac{1}{n}$ DIVERGES
 BY p-SERIES TEST
 ($p=1$)

COMPARISON

22. $\sum_{n=1}^{\infty} \frac{4+3^n}{2^n} \geq \sum_{n=1}^{\infty} \left(\frac{3}{2}\right)^n$ DIVERGES
 GEOMETRIC SERIES
 DIVERGE FOR $|r| \geq 1$.

COMPARISON

24. $\sum_{n=1}^{\infty} \frac{1}{\sqrt{n^2+1}} \leq \sum_{n=1}^{\infty} \frac{1}{\sqrt{n^3}} = \sum_{n=1}^{\infty} \frac{1}{n^{3/2}}$ CONVERGES
 BY p-SERIES TEST
 ($p = \frac{3}{2}$)

25.

$$\sum_{n=1}^{\infty} \frac{1+4^n}{1+3^n} \geq \sum_{n=1}^{\infty} \frac{4^n}{1+3^n} \geq \sum_{n=1}^{\infty} \frac{4^n}{3^n+3^n}$$

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

DIVERGES BECAUSE $\left|\frac{4}{3}\right| > 1$ (Geo. Series)

26.

$$\sum_{n=1}^{\infty} \frac{1}{2n+3} \quad \text{DIVERGES BECAUSE} \quad \int_1^{\infty} \frac{1}{2x+3} dx$$

$$= \frac{1}{2} \ln(2x+3) \Big|_1^{\infty} \quad \text{DIVERGES}$$