quiz16 solutions

March 2020

- Use comparison test or limit comparison test to determine whether

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

converges or diverges.

Sol: Since

$$\lim_{n\to\infty} \frac{\frac{2n+1}{n^2+4n+2}}{\frac{1}{n}} = \lim_{n\to\infty} \frac{2n^2+n}{n^2+4n+2} = 2,$$

by the limit comparison test we know the series diverges.

- Use comparison test or limit comparison test to determine whether

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

converges or diverges.

Sol: Since

$$\lim_{n\to\infty} \frac{\sin\frac{1}{n^2}}{\frac{1}{n^2}} = 1,$$

by the limit comparison test we know the series converges.

- Use comparison tes or limit comparison testt to determine whether

$$\sum_{n=1}^{\infty} \frac{3^n}{4^n+8}$$

converges or diverges.

Sol: Since

$$\frac{3^n}{4^n+8} < \frac{3^n}{4^n} = \left(\frac{3}{4}\right)^n,$$

and

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

converges, by the comparison test we know the series converges.