

solutions

(1)

$$\frac{-1}{x} - \ln|x| + \ln|x^2 + 9| - \tan^{-1} \frac{x}{3}$$

(2)

$$\frac{1}{6} \sin 3x - \frac{1}{28} \sin 7x - \frac{1}{4} \sin x$$

(3) (a) diverges by comparison test

At some value N , $1 < \tan^{-1} N$ so $\sum_{n=N}^{\infty} \frac{1}{n} < \sum_{n=N}^{\infty} \frac{\tan^{-1} n}{n}$

(b) diverges by divergence test

(c) diverges by integral test

(4)

$$\frac{\sqrt{3}}{2} + i\frac{1}{2}, \quad i, \quad -\frac{\sqrt{3}}{2} + i\frac{1}{2}, \quad -\frac{\sqrt{3}}{2} - i\frac{1}{2}, \quad -i, \quad \frac{\sqrt{3}}{2} - i\frac{1}{2}$$

(5)

$$\sum_{n=0}^{\infty} (x-2)^n, \quad (1, 3)$$

(6)

$$\sum_{n=1}^{\infty} \frac{(-1)^n x^{2n-2}}{(2n+1)!} = \sum_{n=0}^{\infty} \frac{(-1)^{n+1} x^{2n}}{(2n+3)!}, \quad (-\infty, \infty)$$

(7)

$$y = \frac{2}{1 - 2 \ln|1 + x^2|}$$

(8)

$$\frac{3\pi}{16} - \frac{1}{2}$$