

Series Quiz



1. Derive the Taylor expansion for $f(x) = \cos(x)$.

2. Test the Series for convergence. If possible find the sum.

a) $\sum_{n=1}^{\infty} \frac{e^n}{3^{n-1}}$

b) $\sum_{n=1}^{\infty} n^{-3} \cos^2(n)$

c) $\sum_{n=0}^{\infty} \frac{\arctan(n)}{1+n^2}$

d) $\sum_{n=0}^{\infty} \frac{(2n)!}{3^n}$

e) $\sum_{n=1}^{\infty} \frac{\ln(n)}{n^5}$

f) $\sum_{n=0}^{\infty} \left(1 - \frac{1}{n}\right)^n$

3. Find the Taylor expansion for $f(x) = x^2 \sin\left(\frac{\pi}{x}\right)$.