

MATH 1552, Integral Calculus

Sections 10.8, 10.9: Taylor Series

1. Find a MacLaurin series for the function $f(x) = \tan^{-1} x$.

2. Find the sum of the series:

$$\frac{\pi}{2} - \frac{\pi^3}{8 \cdot 3!} + \frac{\pi^5}{32 \cdot 5!} + \dots + (-1)^n \frac{\pi^{2n+1}}{2^{2n+1}(2n+1)!} + \dots$$

3. Use a MacLaurin series to estimate $\int_0^1 e^{-x^2} dx$ within an error of no more than 0.01.