LECTURE: CHAPTER 11 REVIEW (PART 2)

Section 11.8 - Power Series

Example 1: Find the radius of convergence and the interval of convergence of $\sum_{n=1}^{\infty} \frac{(-1)^n (x+2)^n}{n4^n}$.

Example 2: Find the interval of convergence of the following series.

(a) $\sum_{n=0}^{\infty} n!(x-2)^n$

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

Section 11.9 - Representations of Functions by Power Series

Example 3: Find the Maclaurin series for f and its radius of convergence. Then find $f'(x)$ for Part (a) and $\int f(x)dx$ for Part (b) and their radii of convergence.

(a) $f(x) = \dfrac{x^2}{1+x^5}$

(b) $f(x) = \dfrac{4}{x^3+8}$

Example 4: Find the power series for $f(x) = \tan^{-1} x$ using an integral or a derivative.

Section 11.10 - Taylor and Maclaurin Series

Write the Maclaurin series and the interval of convergence for each of the following functions.

- $1/(1-x) =$
- $e^x =$
- $\sin x =$
- $\cos x =$
- $\tan^{-1} x =$

Example 5: Find the Taylor series of $f(x) = e^{2x}$ at $a = 6$.

Example 6: Find the Maclaurin series for f and its radius of convergence.

(a) $f(x) = \tan^{-1}(x^3)$

(b) $f(x) = xe^{3x}$

Example 7: find the Maclaurin series for f and its radius of convergence.

(a) $f(x) = \sin\left(\frac{x^4}{2}\right)$

(b) $f(x) = 10^x$

Example 8: Evaluate $\int \frac{e^x}{x} dx$ as an infinite series.

Example 9: Find the sum of the following series.

(a) $\sum_{n=0}^{\infty} \frac{(-1)^n \pi^n}{3^{2n}(2n)!}$

(b) $1 - e + \frac{e^2}{2!} - \frac{e^3}{3!} - \cdots$