Math 426.2SY
Calculus II

University of New Hampshire

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Outline

1 Chapter 9, Review Problems

Infinite Series

Determine whether the following series are convergent or divergent. For convergent geometric series, find the sum as well. Show which test is used and give full arguments.

Infinite Series

a) $\displaystyle\sum_{n=1}^{\infty} \frac{n}{\sqrt{n^4 - 2n + 3}}$

b) $\displaystyle\sum_{n=3}^{\infty} \frac{\sqrt{n-2}}{3n^2 + n - 1}$

c) $\displaystyle\sum_{n=0}^{\infty} \frac{n^2}{n^4 - 2n^2 + 4}$

d) $\displaystyle\sum_{n=2}^{\infty} (1 - \frac{2}{n})^n$

e) $\displaystyle\sum_{n=1}^{\infty} \left(\frac{2n-1}{3n+2}\right)^n$

f) $\displaystyle\sum_{n=1}^{\infty} \left(\frac{5n-3}{4n+1}\right)^n$

g) $\displaystyle\sum_{n=1}^{\infty} \frac{2n^4}{3^n}$

h) $\displaystyle\sum_{n=0}^{\infty} \frac{2^{n+1}}{(n+3)!}$

i) $\displaystyle\sum_{n=0}^{\infty} \frac{(n+2)!}{8^{2n}}$

j) $\displaystyle\sum_{n=1}^{\infty} \frac{2^{n+1}}{n^5 - 1}$

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

l) $\displaystyle\sum_{n=0}^{\infty} \frac{(n+2)!}{(n+4)!}$

m) $\displaystyle\sum_{n=1}^{\infty} 2(\frac{3}{4})^{2n-1}$

n) $\displaystyle\sum_{n=1}^{\infty} 3(\frac{-4}{3})^{n+1}$

o) $\displaystyle\sum_{n=0}^{\infty} 5(-1)^{n+1}$

Infinite Series

p) $\sum_{n=1}^{\infty} \frac{\ln(n)}{n^{1/2}}$ q) $\sum_{n=1}^{\infty} \frac{\ln(n)}{n}$ r) $\sum_{n=1}^{\infty} \frac{ln(n)}{n^{1.002}}$

s) $\sum_{n=3}^{\infty} \frac{1}{n^2 \ln(n)}$ t) $\sum_{n=3}^{\infty} \frac{1}{n \ln(n)}$ u) $\sum_{n=3}^{\infty} \frac{1}{n^{1/2} \ln(n)}$

Infinite Series

Find the Taylor series generated by the f at a

- $f(x) = \sqrt{x}, \qquad a = 4$
- $f(x) = xe^x, \qquad a = 0$
- $f(x) = \dfrac{x}{x^2+1}, \qquad a = 0$
- $f(x) = x^3 - 2x + 4, \qquad a = 2$

Infinite Series

In the following exercises find the series' radius and interval of convergence. For what values of x does the series converge absolutely / conditionally?

- $\displaystyle\sum_{n=1}^{\infty} \frac{nx^n}{n+2}$
- $\displaystyle\sum_{n=1}^{\infty} \frac{x^n}{n\sqrt{n}3^n}$
- $\displaystyle\sum_{n=1}^{\infty} n^n x^n$
- $\displaystyle\sum_{n=1}^{\infty} (\ln(x))^n$