## Instruction:

Complete all questions in 1 hr.

1. Explain the necessary condition for a series to be convergent. Determine which of the following series can not be convergent?

a) Writing in Summation Foom  $\leq \frac{n}{n+1}$ 

Tutotial 7

= 1 + 0, so the series an never be orrangent

+ 1/00 + 0. so this series may be convertent

2. Explain the alternating series test. Determine whether the following series are convergent or divergent by using alternating series test.

gent by using alternating 
$$\text{a.} \sum_{p=1}^{\infty} (-1)^p \frac{2p-1}{2p+1}$$
 
$$\text{b.} \sum_{p=1}^{\infty} \frac{(-1)^{p+1}}{p-1}$$

- p=1 **p**2
- 3. Determine whether the following series are convergent or divergent by using ratio test. a.

$$1 + \frac{1}{2} + \frac{1}{3} + \frac{1}{4} + .$$

$$\sum_{n=1}^{\infty} \frac{1}{\sqrt{n}}$$

c. 
$$\frac{1}{\ln 3} + \frac{8}{(\ln 3)^2} + \frac{27}{(\ln 3)^3} + \dots$$

24) Here,
$$\sum_{n=0}^{\infty} (-1)^{2n} \frac{2n-1}{2n+1}$$

$$\frac{1}{2n+1} = \frac{2-0}{2+0}$$

$$\frac{2}{2} = \frac{2}{2}$$

= 1 70,80 the series is directed

b) Here

$$\frac{(-1)^{m+1}}{n^2}$$
 $\frac{2^{nd}}{n^{n+1}}$ 
 $\frac{2^{nd}}{n^{n+1}}$ 

Horse the series is convergent

. 1 Since 1:7 test is Concluing. Proserves beed En. 1 1/2

Company with an easet P: Y, fall under p = 1 so divergent

$$\leq \sum_{i=1}^{\infty} \left( \frac{n^{-i}}{(\ln 3)} \right)$$

For retio treat

$$\frac{1}{n-2} = \frac{\left(\frac{n+1}{3}, \frac{1}{n}, \frac{1}{n}\right)}{\left(\frac{1}{n}, \frac{1}{3}, \frac{1}{n}, \frac{1}{n}\right)}$$

$$= \frac{\left(\frac{n+1}{3}, \frac{1}{n}, \frac{1}{n}, \frac{1}{n}\right)}{\left(\frac{1}{n}, \frac{1}{3}, \frac{1}{n}, \frac{1}{n}\right)}$$

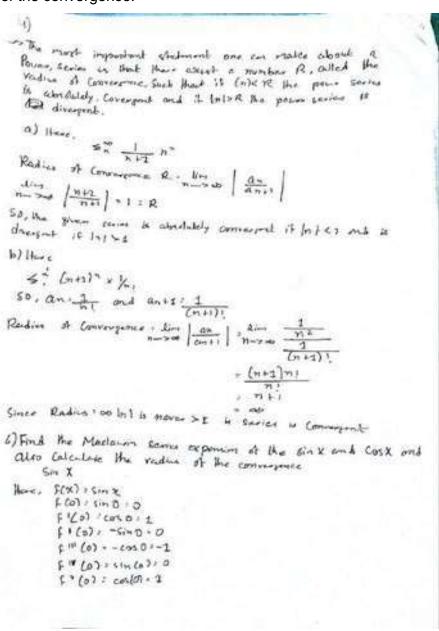
$$= \frac{\left(\frac{n+1}{3}, \frac{1}{n}, \frac{1}{n}, \frac{1}{n}\right)}{\left(\frac{1}{n}, \frac{1}{3}, \frac{1}{n}\right)}$$

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4. Write short note on radius of convergence. Find the radius of convergence of the following power series. x x2 x3

a. 
$$1 + \frac{1}{2} + \frac{1}{3} + \frac{1}{4} + \frac{1}{4}$$

- 5. Find the Maclaurin series expansion of ln(x + 1).
- 6. Find the Maclaurin series expansion of the **sinx** and **cosx** and also calculate the radius of the convergence.



- 7. Find the Maclaurin series of  $(1 x)^{-3}$  and calculate the radius of convergence.
- 8. Find the Taylor series expansion of  $e^x$  about x=0.

1

Find the Taylor series expansion of \_\_ about x=-1. x2

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10. Find the Tylor series expansion of  $x^3$  -  $10x^2$  + 6 about x = 3. "The End"