

MATHEMATICS 1

1. Find $\lim_{\substack{x \rightarrow 1 \\ y \rightarrow 2}} \frac{2x^2y}{x^2+y^2+1}$ ——— (3)

[CO: Understanding of functions of Several Variables & their applications]

2. Find $\frac{\partial z}{\partial x}$ & $\frac{\partial z}{\partial y}$ if $z = \log(x^2+y^2)$ ——— (3)

[CO: Understanding of functions of several variables & their applications]

3. If $u = \cos^{-1}\left(\frac{x+y}{\sqrt{x}+\sqrt{y}}\right)$, prove that

$x \frac{\partial u}{\partial x} + y \frac{\partial u}{\partial y} = -\frac{1}{2} \cot(u)$ ——— (4)

[CO: Understanding of functions of several variables & their applications]

4. Given $\sum a_n = \sum_{n=0}^{\infty} \frac{2n^3+5}{4n^5+1}$

Find out the nature of this Series. ——— (5)

[CO: Learn about Infinite Series & test to check its behaviour]

5. Test for Convergence

$\frac{x}{1+x} + \frac{x^2}{1+x^2} + \frac{x^3}{1+x^3} + \dots \infty$ ——— (5)

[CO: Learn about Infinite Series & tests to check its behaviour]

6. Test for Convergence

$\frac{1}{\log 2} - \frac{1}{\log 3} + \frac{1}{\log 4} - \frac{1}{\log 5} + \dots$ ——— (5)

[CO: Learn about Infinite Series & tests to check its behaviour]