

Nirma University
Institute of Technology
Department of Mathematics & Humanities
B. Tech. (ALL) – Semester - I
Calculus (MA101)

Given week:

Tutorial – 8

Submission week:

Part I: Differential Calculus

1. If $f(x, y) = x^2 y^2 + y \sin x$ where, $x = \sin 2t$, $y = \log t$. Find $\frac{df}{dt}$.
2. If $z = x \log xy + y^2$ where $y = \sin(x^2 + 1)$. Find $\frac{\partial z}{\partial x}$.

Part-II Integral Calculus

1. Evaluate $\iint_R x^p y^q dx dy$ where R is the region bounded by $x = 0, y = 0$ & $\frac{x^2}{a} + \frac{y^2}{b} = 1$.
2. Evaluate $\int_0^2 \int_0^{4-x^2} \frac{x e^{2y}}{4-y} dy dx$.
3. Evaluate $\int_0^8 \int_{\sqrt{x}}^2 \frac{1}{1+y^4} dy dx$.
4. Evaluate $\iiint (1+x+y+z)^4 dz dy dx$ over the tetrahedron bounded by $x = 0, y = 0, z = 0$ & $x + y + z = 1$.
5. Evaluate $\int_{-1}^0 \int_{-\sqrt{1-x^2}}^0 \frac{2}{1 + \sqrt{x^2 + y^2}} dy dx$.
6. Evaluate $\int_0^{\pi/4} \int_0^{\log \sec v} \int_{-\infty}^{2t} e^{xt} dx dt dv$.