



PARUL UNIVERSITY
Faculty of Engineering & Technology
Department of Applied Sciences and Humanities
1ST SEMESTER B.Tech PROGRAMME (CSE, IT)
CALCULUS(03019101BS01)
ACADEMIC YEAR – 2025-26

TUTORIAL -3B MULTIPLE INTEGRATION

1	Find the area of the plate in the form of a quadrant of a circle $x^2 + y^2 = a^2$.
2	Find the area bounded by $y = 2 - x$ and $y^2 = 2(x + 2)$.
3	Find the area common to the circles $r = a$ and $r = 2a \cos \theta$; $a > 0$.
4	Evaluate a) $\int_0^1 \int_0^2 \int_0^e dy dx dz$ b) $\int_0^2 \int_1^3 \int_1^2 xy^2 z dz dy dx$
5	Evaluate a) $\int_0^1 \int_0^{2-x} \int_0^{x-y} dz dy dx$ b) $\int_0^a \int_0^{\sqrt{a^2-x^2}} \int_0^{\sqrt{a^2-x^2-y^2}} xyz dx dy dz$
6	Evaluate: $\int_0^1 \int_0^{\sqrt{z}} \int_0^{2\pi} (r^2 \theta + z^2) r d\theta dr dz$
7	Evaluate $\iiint xyz dx dy dz$ over the region bounded by the planes $x = 0, y = 0, z = 0, z = 1$ and the cylinder $x^2 + y^2 = 1$
8	Find the volume of the region bounded by the surface $x = 0, y = 0, z = 0$ and $2x + 3y + z = 6$.
9	Find the volume to the cylinders $x^2 + y^2 = a^2$ and $x^2 + z^2 = a^2$.
10	Find the volume of the solid bounded by the sphere $x^2 + y^2 + z^2 = 6$ and the paraboloid $z = x^2 + y^2$