

SRM Institute of Science and Technology
Department of Mathematics
18MAB102T-Advanced Calculus and Complex Analysis
2021-2022 Even
Module – I: Multiple
Integrals Tutorial Sheet - II

S.No	Questions	Answers
Part – A [4 Marks]		
1	Find the area bounded by the lines $x=0$, $y=1$ and $y=x$ using double integration	$\frac{1}{2} sq. units$
2	Find the area of a circle of radius 'a' by double Integration in polar coordinates	πa^2 sq. units
3	Evaluate $\int \int dx dy$ over the region bounded by $x=0$, $x=2$, $y=0$ and $y=2$	4
4	Find the area of the lemniscate $r^2 = a^2 \cos 2\theta$ by double integration	a^2 sq. units
5	Change to polar ordinates : $\int_0^a \int_y^a \frac{x^2 dx dy}{\sqrt{x^2 + y^2}}$	$\int_0^{\pi/4} \int_{a \sec \theta}^a r^2 \cos^2 \theta dr d\theta$
Part – B [6 Marks]		
6	Find the smaller of the area bounded by $y = 2 - x$ and $x^2 + y^2 = 4$	$\pi - 2$
7	Evaluate $\iint xy(x + y) dx dy$ over the area between $y = x^2$ and $y = x$	$\frac{3}{56}$
8	Find the area lying inside the circle $r = a \sin \theta$ and the outside the cardioid $r = a(1 - \cos \theta)$	$\frac{a^2}{2} \left(2 - \frac{\pi}{2} \right)$
9	Find $\int \int r^3 dr d\theta$ over the area A which is the region between the circles $r = 2 \sin \theta$ & $r = 4 \sin \theta$.	$\frac{45\pi}{2}$
10	Find the area of the cardioid $r = a(1 - \cos \theta)$	$\frac{3\pi a^2}{2} sq. units$