SRM INSTITUTE OF SCIENCE & TECHNOLOGY
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SRM Institute of Science and Technology
Kattankulathur

DEPARTMENT OF MEATHEMATICS

18MAB102T ADVANCED CALCULUS & COMPLEX ANALYSIS

UNIT -1 Multiple Integrals

Tutorial Sheet -1

Sl.No.	Questions	Answer
	PART -A	
1	Evaluate $\int_0^3 \int_0^2$ xy(x + y) dxdy	30
2	Evaluate $\int_0^1 \int_1^2 (x^2y + y^2 + 6)dx\,dy$	15/2
3	Evaluate $\int_0^1 \int_0^{x^2} (x^2 + y^2)\,dy\,dx$	26/105
4	Evaluate $\int_0^{\pi/2} \int_0^{\sin\theta} r\ d\theta\,dr$	$\frac{\pi}{8}$
5	Evaluate $\int_0^{\pi} \int_0^{a(1+\cos\theta)} r\ dr\,d\theta$	$\frac{3\pi a^2}{4}$
	PART -B	
6	i) Evaluate $\iint_A xy\ dxdy$ where A is the area bounded by $y^2 = 4ax$, y = 2a and y-axis. ii) Find the area enclosed by the ellipse using double integration $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$	$\frac{a^4}{3}$ π ab
7	Change the order of integration and hence evaluate $\int_{-a}^{a} \int_0^{\sqrt{a^2-y^2}} x\,dxdy$	$2a^3/3$
8	Change the order of integration and hence evaluate $\int_0^1 \int_{x^2}^{2-x} xy\,dydx$	3/8
9	Change the order of integration and hence evaluate $\int_0^{4a} \int_{\frac{x^2}{4a}}^{2\sqrt{ax}} xy\,dydx$	$64a^4/3$
10	Evaluate $\int_0^{\infty} \int_x^{\infty} \frac{e^{-y}}{y} dydx$ by changing the order of Integration	1

Co-Ordinators : Dr.Sundarammal Kesavan, Dr.V.Srinivasan, Dr.N.Parvathi , Dr.N.Balaji

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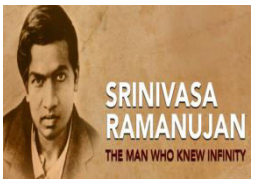
UNIT -1 Multiple Integrals

Tutorial Sheet -2



Sl.No.	Questions	Answer
	PART -A	
1	Evaluate $\int_0^1\int_0^2\int_0^3 xyz\,dxdydz$	$\frac{9}{2}$
2	Evaluate $\int_0^1\int_{y^2}^1\int_0^{1-x} x\,dzdydx$	$\frac{4}{35}$
3	Show that $\int_0^1\int_0^{\sqrt{1-x^2}}\int^{\sqrt{1-x^2-y^2}} \frac{dxdydz}{\sqrt{1-x^2-y^2-z^2}}=\frac{\pi^2}{8}$.	
4	Evaluate $\int_0^1\int_0^{1-z}\int_0^{1-y-z} xyz\,dxdydz$	$\frac{23}{180}$
5	Find $\iiint_R (x-y+z)dxdydz$ where R is given by $1\le x\le 2,\ 2\le y\le 3,\ 1\le z\le 3$	2
6	i)Find the area of $r^2 = a^2\cos 2\theta$ by double integration ii) Find the area enclosed by $y = x$ & $y = x^2$ in the first quadrant, using double integration	a^2 $\frac{1}{6}$
7	Find the smaller of the area bounded by $y = 2 - x$ and $x^2 + y^2 = 4$	$\pi + 2$
8	Find the volume of ellipsoid $\frac{x^2}{a^2}+\frac{y^2}{b^2}+\frac{z^2}{c^2}=1$	$\frac{4\pi abc}{3}$
9	Find the area lying inside the circle $r = a\sin\theta$ and the outside the Co-ordinate $r = a(1 - \cos\theta)$	$\frac{a^2}{2}\left[\frac{\pi}{2}-2\right]$
10	Find the Area $\int\int r^3\,dr\,d\theta$ over the bounded between circles $r = 2\cos\theta$, $r = 4\cos\theta$	$45\,\pi/2$

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