



DEPARTMENT OF MATHEMATICS

UNIT V

Application of double integrals (area) :

$$\text{Area} = \iint dx dy \quad \text{or} \quad \iint dy dx$$

- ① Evaluate $\iint dx dy$ over the region bounded by $x=0$, $x=2$, $y=0$, $y=2$.

Solution :

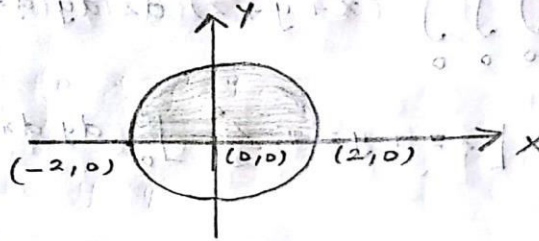
$$\begin{aligned} \text{Area} &= \iint dx dy \\ &= \int_0^2 \int_0^2 dx dy \\ &= \int_0^2 [x]_0^2 dy \\ &= \int_0^2 (2-0) dy \\ &= 2 \int_0^2 dy \\ &= 2 [y]_0^2 \\ &= 2(2-0) \end{aligned}$$

$\text{Area} = 4 \text{ square units}$



DEPARTMENT OF MATHEMATICS

2) Evaluate $\iint_R dx dy$ where R is the shaded region in the figure.



Solution:

$$\begin{aligned}\iint_R dx dy &= \text{Area of the shaded region} \\ &= \text{Area of semicircle} \\ &= \frac{1}{2} \pi r^2 \\ &= \frac{1}{2} \pi (2^2) \\ &= 2\pi \text{ sq. units.}\end{aligned}$$