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 :

$$\text{Area} = \iint dx\,dy$$

$$= \int_0^2 \int_0^2 dx\,dy$$

$$= \int_0^2 [x]_0^2\, dy$$

$$= \int_0^2 (2-0)\, dy$$

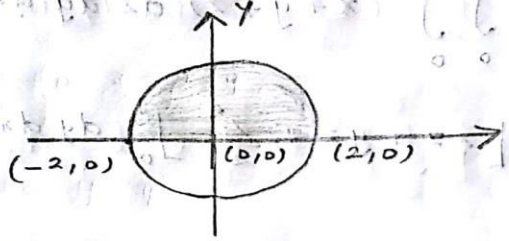
$$= 2\int_0^2 dy$$

$$= 2\,[y]_0^2$$

$$= 2\,(2-0)$$

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

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



Solution :-

$$\iint_R dx\,dy = \text{Area of the shaded region}$$

$$= \text{Area of semicircle}$$

$$= \frac{1}{2}\pi r^2$$

$$= \frac{1}{2}\pi (2^2)$$

$$= 2\pi \text{ sq. units.}$$