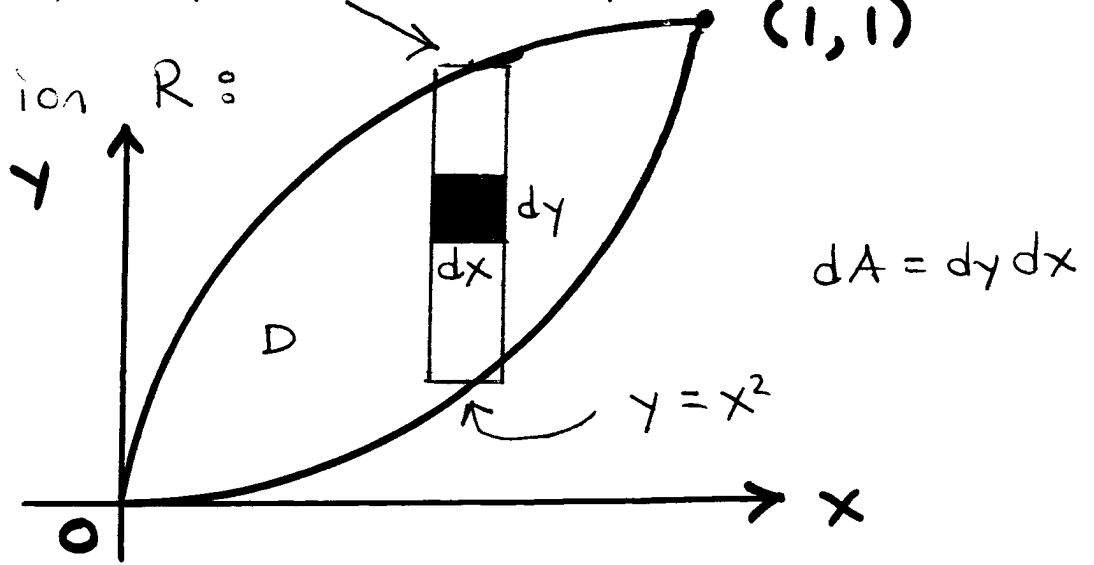


Ex. Evaluate $\iint_D (x+y) dA$ where D is the region bounded by $y = \sqrt{x}$ and $y = x^2$.

Graph region R :



Outer rectangle:

LL: $x = 0$

thickness = dx

UL: $x = 1$

Inner rectangle:

LL: $y = x^2$

thickness = dy

UL: $y = \sqrt{x}$

So

$$\iint_D (x+y) dA$$

$$= \int_0^1 \int_{x^2}^{\sqrt{x}} (x+y) dy dx$$

$$= \int_0^1 \left(xy \Big|_{y=x^2}^{\sqrt{x}} + \frac{1}{2} y^2 \Big|_{y=x^2}^{\sqrt{x}} \right) dx$$

$$= \int_0^1 [x(\sqrt{x} - x^2) + \frac{1}{2}(x - x^4)] dx$$

$$= \int_0^1 [x^{3/2} - x^3 + \frac{1}{2}x - \frac{1}{2}x^4] dx$$

$$= \left(\frac{2}{5}x^{5/2} - \frac{1}{4}x^4 + \frac{1}{4}x^2 - \frac{1}{10}x^5 \right) \Big|_{x=0}^1$$

$$= \frac{2}{5} - \frac{1}{4} + \frac{1}{4} - \frac{1}{10}$$

$$= \frac{3}{10}$$