Question 2: Let S(α) = {(x, y); $y^2 \leq x, y^2 \leq \alpha$ } and, A(α) is area of the region S(α). If for λ, 0 < λ < 4 and A(λ) : A(4) = 2 : 5. Then what will be the value of λ.

Solution:

Let S(α) = {(x, y); $y^2 \leq x, y^2 \leq \alpha$ }

$$A(\alpha) = 2\int_0^{\alpha} \sqrt{x}\, dx = 2\alpha^{3/2}$$

A(4) = 2 x $4^{3/2}$ = 16 and A(λ) = 2 x $\lambda^{3/2}$

As we know,

A(λ)/A(4) = 2/5

On putting values, we have

=> λ = 4 $(4/25)^{1/3}$