

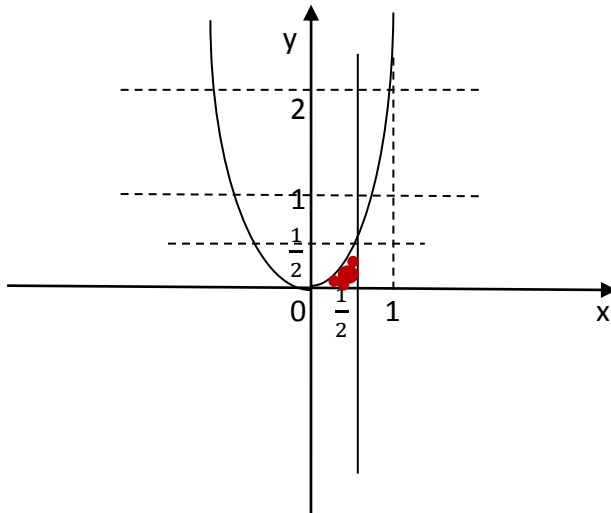
Answer on Question # 41420 – Math – Integral Calculus

Integrate $f(x,y)=x^2 + y$ over the region bounded by $y=2x^2$, X-axis, $x = 1/2$.

Solution:

$$y = 2x^2, x = \frac{1}{2}, y = 0 - \text{X-axis.}$$

Let sketch the region:



Let Integrate $f(x,y)=x^2 + y$:

$$\begin{aligned} \int_0^{\frac{1}{2}} dx \int_0^{2x^2} (x^2 + y) dy &= \int_0^{\frac{1}{2}} dx \left(x^2 y + \frac{y^2}{2} \right) \Big|_0^{2x^2} = \int_0^{\frac{1}{2}} \left(2x^4 + \frac{4x^4}{2} \right) dx = \\ &= \int_0^{\frac{1}{2}} 4x^4 dx = \frac{4x^5}{5} \Big|_0^{\frac{1}{2}} = \frac{4}{5} \cdot \frac{1}{32} = \frac{1}{40} \end{aligned}$$

Answer: $\frac{1}{40}$.