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Subject:- Calculus.

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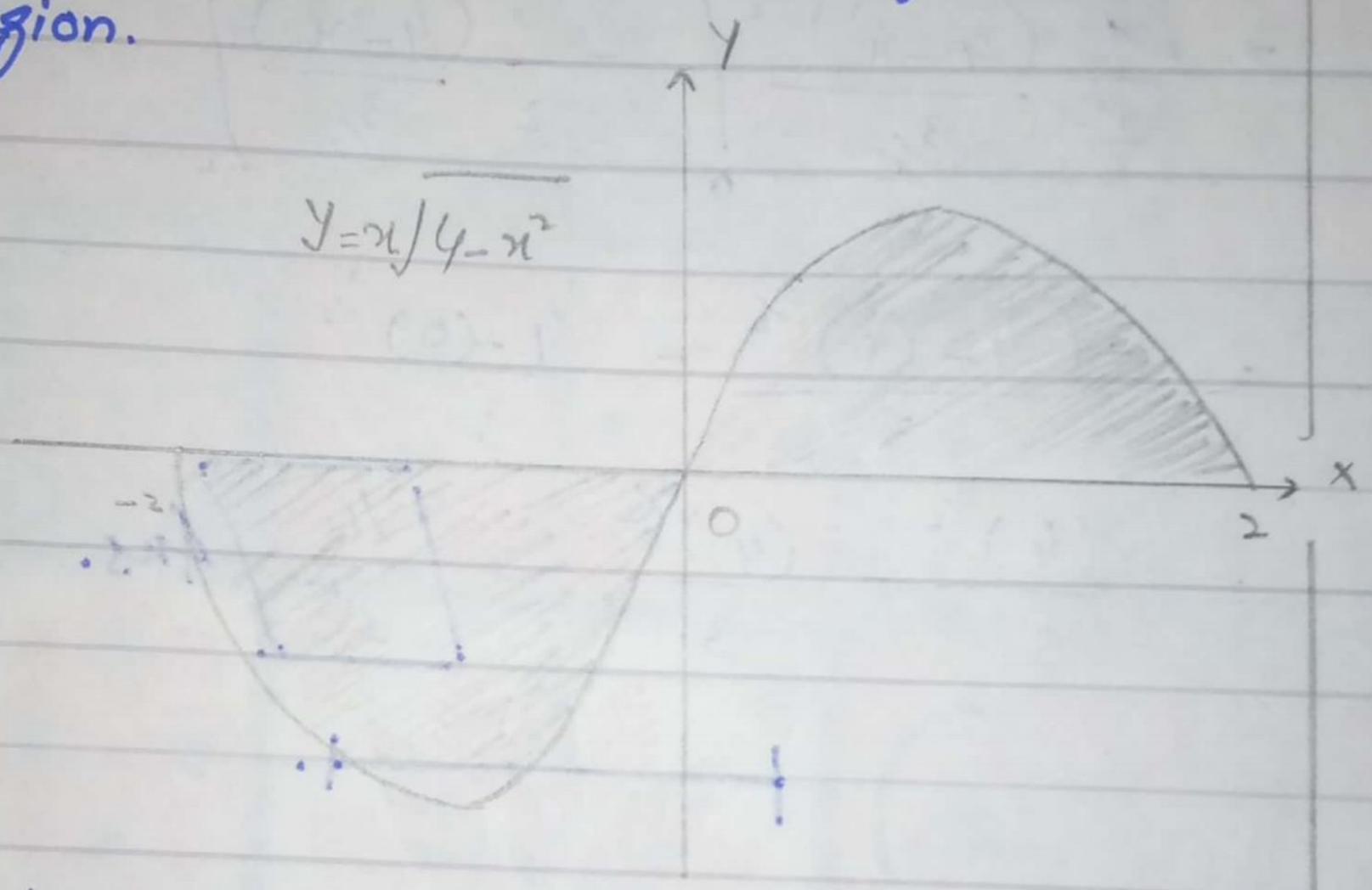
Q1- Find the area of region bounded by the shaded region.



Let $u = 4 - x^2$

$du = 0 - 2x\,dx$

$du = -2x\,dx$.

$\Rightarrow \frac{-1}{2} du = x\,dx$

$\therefore \quad x = -2, \quad u = 0, \quad x = 0.$

$\Rightarrow \quad u = 4, \quad x = 2, \quad u = 0.$

$$A = \int_{-2}^{0} x\sqrt{4-x^2}\,dx + \int_{0}^{2} x\sqrt{4-x^2}\,dx$$

Kply and divide by "-2".

$$= -\frac{1}{2}\int_0^2 -2x\sqrt{4-x^2}\,dx + \left(-\frac{1}{2}\right)\int_{-2}^{0} x\sqrt{4-x^2}\,dx.$$

$$= \frac{-1}{2}\int_0^2 \sqrt{4-x^2}\,2x\,dx - \frac{1}{2}\int_{-2}^{0}\sqrt{4-x^2}\,2x\,dx.$$

$$= \frac{-1}{2}\frac{(4-x^2)^{3/2}}{3/2}\Bigg|_0^2 - \frac{1}{2}\frac{(4-x^2)}{3/2}\Bigg|_{-2}^{0}$$

$$= -\frac{(4-(0)^{3/2}}{3} - \frac{4-(0)^{3/2}}{3}$$

$$= \frac{(4)^{3/2}}{3} - \frac{(4)^{3/2}}{3} = \boxed{\frac{16}{3}}$$ Ans.