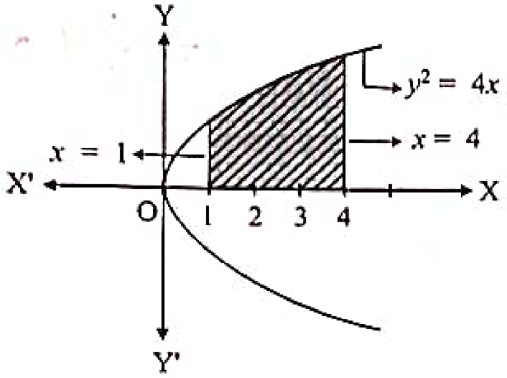
A. Activities

Carry out the following activities

1. Find the area of the shaded portion using the following information



Required Area $= \int_1^4 y\,dx$

$= \int_1^4 2\sqrt{x}\,dx$

$= 2\left[\dfrac{x^{3/2}}{3/2}\right]_1^4$

$= \dfrac{4}{3}\left[(4)^{3/2} - (1)^{3/2}\right]$

$= \dfrac{4}{3}\left[8 - 1\right] = \dfrac{28}{3}$ sq. unit

Ans

2. Find the area of the region under the curve $x = \frac{36}{25}(25 - y)^2$, and the lines $y = 0$, $y = 5$ and the X-axis using the following activity.

Required area $= \int_0^5 x\,dy$

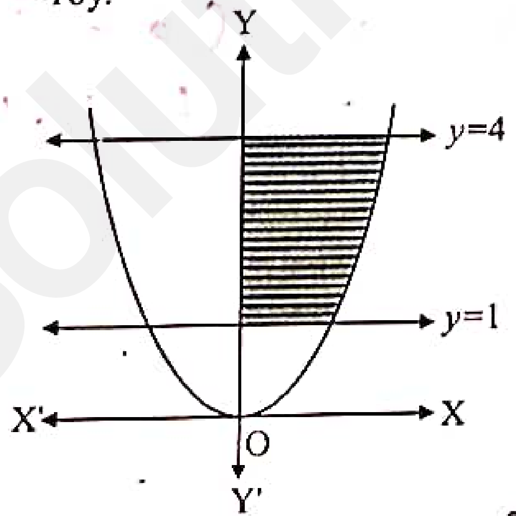
$= \int_0^5 \frac{\boxed{36}}{\boxed{25}}\left(\boxed{25} - y^2\right) dy$

$= \frac{\boxed{36}}{\boxed{25}} \int_0^5 \left(\boxed{25} - y^2\right) dy$

$= \frac{36}{25}\left(25y - \frac{y^3}{3}\right)_0^5$

$= \boxed{120}$ sq. units.

3. Find the area shown in the following figure and the information given $x^2 = 16y$.



Required Area $= \int_1^4 x\,dy$

$= \int_1^4 4\sqrt{y}\,dy$

$= 4\left[\dfrac{y^{3/2}}{3/2}\right]_1^4$

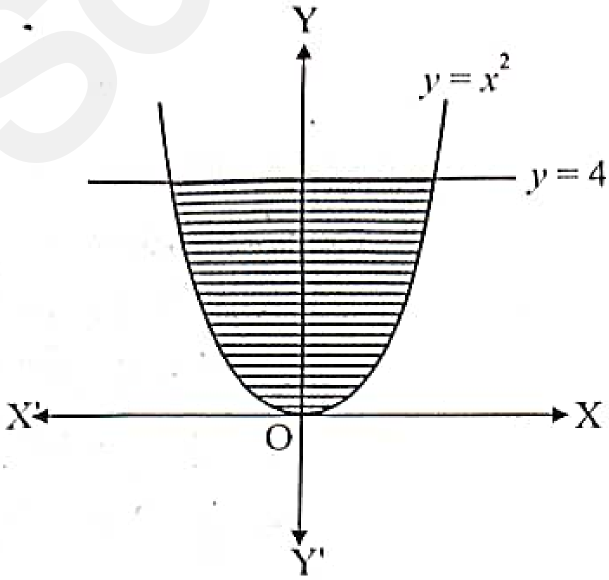
$= \dfrac{8}{3}\left[(4)^{3/2} - (1)^{3/2}\right]$

$= \dfrac{8}{3}(8 - 1)$

$= \dfrac{56}{3}$ sq. unit

Ans

4. Find the shaded area using following information.



Required Area $= 2\int_0^4 x\,dy$

$= 2\int_0^4 \sqrt{y}\,dy$

$= 2\left[\frac{y^{3/2}}{3/2}\right]_0^4$

$= \frac{4}{3}(8-0) = \frac{32}{3}$ sq. unit

Ans

B. Solve the Following

Q.1. Find the area bounded by the curve y = 2x, X-axis and the lines x = -2 and x = 4

Required area $= \int_{-2}^{4} y\,dx$

$= \int_{-2}^{4} 2x\,dx$

$= 2\int_{-2}^{4} x\,dx$

$= 2\left[\frac{x^2}{2}\right]_{-2}^{4}$

$= \frac{2}{2}\left[(4)^2 - (-2)^2\right]$

$= (8 - 4)$

$= 4$ sq. unit.

Ans

Q.2. Find the area of the regions bounded by the following curves, the X-axis and the given lines.

a) $y = x^2$, $x = 1, x = 3$ b) $y^2 = 4, x = 1, x = 4$.

Solⁿ:-

a) $A = \int_1^3 y\,dx = \int_1^3 x^2\,dx = \left[\frac{x^3}{3}\right]_1^3$

$= \frac{1}{3}\left[(3)^3 - (1)^3\right] = \frac{1}{3}(27-1) = \frac{26}{3}$ sq.unit

b) $A = 2\int_1^4 y\,dx = 2\int_1^4 2\sqrt{x}\,dx$

$= 4\int_1^4 \sqrt{x}\,dx$

$= 4\left[\frac{x^{3/2}}{3/2}\right]_1^4$

$= \frac{8}{3}\left[(4)^{3/2} - (1)^{3/2}\right]$

$= \frac{8}{3}(8-1)$

$= \frac{56}{3}$ sq.unit

Q.3. Find the area of the region bounded by the parabola $y^2 = 16x$ and the line $x = 4$

Solⁿ:-

Given:- $y^2 = 16x$ $\therefore y = 4\sqrt{x}$ (in Ist quadrant)

Required area $= 2\int_0^4 4\sqrt{x}\,dx$

$= 8\left[\frac{x^{3/2}}{3/2}\right]_0^4$

$= \frac{16}{3}\left[(4)^{3/2} - (0)^{3/2}\right]$

$= \frac{16}{3} \times (8-0)$

$= \frac{128}{3}$ sq.unit.

Sign of Teacher :