DPP

DAILY PRACTICE PROBLEMS

Class : XIth
Date :

Solutions

Subject : Maths
DPP No. : 6

Topic :-Applications of integrales

1 **(a)**

The given equation of curves are

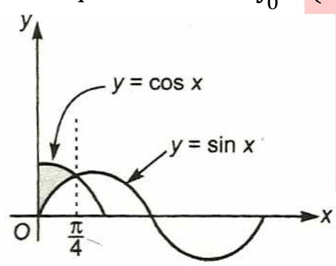
$y = \sin x$ ...(i)

and $y = \cos x$ ...(ii)

From Eqs. (i) and (ii), we get

$\sin x = \cos x \Rightarrow x = \frac{\pi}{4}$

$\therefore$ Required area $= \int_0^{\pi/4} (\cos x - \sin x) dx$



$= [\sin x + \cos x]_0^{\pi/4}$

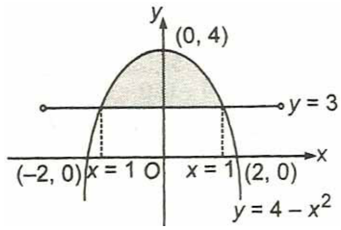
$= \left(\sin\frac{\pi}{4} + \cos\frac{\pi}{4} - \cos 0\right)$

$= \left[\frac{1}{\sqrt{2}} + \frac{1}{\sqrt{2}} - 1\right]$

$= \frac{2}{\sqrt{2}} - 1 = (\sqrt{2} - 1)$ sq unit

4 **(d)**

$y = \left[3 + \frac{x^2}{4}\right] = 3, -2 < x < 2$



Required area $= 2\left\{\int_0^1 (4-x^2)dx - 3\right\}$

$= 2\left\{\left[4x - \frac{x^3}{3}\right]_0^1 - 3\right\}$

$= 2\left\{4 - \frac{1}{3} - 3\right\}$

$= \frac{4}{3}$ sq unit

7 **(d)**

The given eqution of curve can be written as $\frac{x^2}{4} + \frac{y^2}{9} = 1$

Here, $a = 2, b = 3$

$\therefore$ Required area $= \pi ab$

$= \pi \times 2 \times 3$

$= 6\pi$ sq units

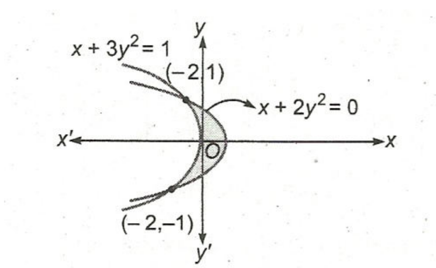
8 **(a)**

On solving the given curves, we get

$y = \pm 1$ and $x = -2$

$\therefore$ Required aerea $= \left|\int_{-1}^{1} (x_1 - x_2)dy\right|$

$= \left|\int_{-1}^{1} (1 - 3y^2 + 2y^2)dy\right|$



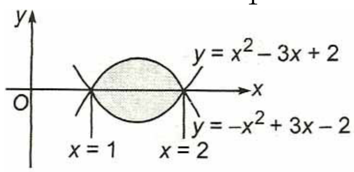
$= \left|2\int_0^1 (1 - y^2)dy\right|$

$= \left|2\left[y - \frac{y^3}{3}\right]_0^1\right|$

$= \frac{4}{3}$ sq units

9 **(d)**

Required area $= 2\int_1^2 (-x^2+3x-2)dx$ ($\because$ both portions are same)



$= 2\left[-\frac{x^3}{3} + \frac{3x^2}{2} - 2x\right]_1^2$

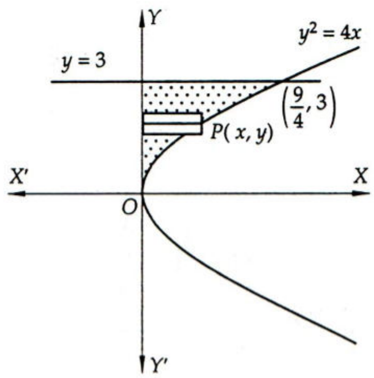
$= 2\left[-\frac{8}{3} + 6 - 4 - \left(-\frac{1}{3} + \frac{3}{2} - 2\right)\right]$

$= 2\left[-\frac{8}{3} + 2 + \frac{5}{6}\right] = \frac{1}{3}$ sq unit

11 **(b)**

Let A be the required area. Then,

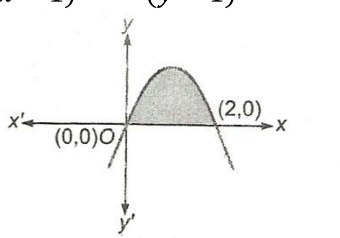
$A = \int_0^3 x\,dy = \int_0^3 \frac{y^2}{4}dy = \left[\frac{y^3}{12}\right]_0^3 = \frac{27}{12} = \frac{9}{4}$



13 **(b)**

Given curve can be rewritten as

$(x-1)^2 = -(y-1)$



The curve cut the x-axis at (0,0) and (2,0)

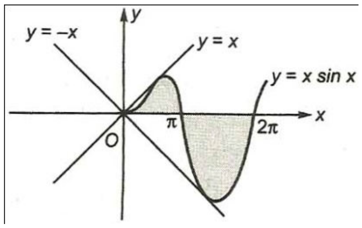
$\therefore$ Required area $= \int_0^2 (2x - x^2)dx$

$= \left[x^2 - \frac{x^3}{3}\right]_0^2$

$= \frac{4}{3}$ sq units

15 **(c)**

Required area $= \int_0^{\pi} x \sin x \, dx + \left| \int_{\pi}^{2\pi} x \sin x \, dx \right|$



$= \{ - x\cos x + \sin x\}_0^{\pi} + |\{ - x\cos x + \sin x\}_{\pi}^{2\pi}|$

$= (\pi + 0) - (0 + 0) + |(-2\pi + 0) - (\pi + 0)$

$= \pi + 3\pi$

$= 4\pi$ sq unit

ANSWER-KEY										
Q.	1	2	3	4	5	6	7	8	9	10
A.	A	D	C	D	B	B	D	A	D	B
Q.	11	12	13	14	15	16	17	18	19	20
A.	B	C	B	C	C	C	B	B	A	D