# EXERCISE-I

## Area bounded by region, Volume and surface area of solids of revolution

**1.** If the ordinate $x = a$ divides the area bounded by the curve $y = \left(1 + \frac{8}{x^2}\right)$, $x-$axis and the ordinates $x = 2,\ x = 4$ into two equal parts, then $a =$

(A) 8 (B) $2\sqrt{2}$

(C) 2 (D) $\sqrt{2}$

**2.** Area between the curve $y = \cos x$ and $x-$axis when $0 \le x$ is

(A) 2 (B) 4

(C) 0 (D) 3

**3.** Area bounded by curve $y = x^3$, $x-$axis and ordinates $x = 1$ and $x = 4$, is

(A) 64 *sq. unit* (B) 27 *sq. unit*

(C) $\frac{127}{4}$ *sq. unit* (D) $\frac{255}{4}$ *sq. unit*

**4.** Area bounded by curve $xy = c$, $x-$axis between $x = 1$ and $x = 4$, is

(A) $c\log 3$ *sq. unit* (B) $2\log c$ *sq. unit*

(C) $2c\log 2$ *sq. unit* (D) $2c\log 5$ *sq. unit*

**5.** Area bounded by curve $y = k\sin x$ between $x = \pi$ and $x = 2\pi$, is

(A) 2k *sq. unit* (B) 0

(C) $\frac{k^2}{2}$ *sq. unit* (D) k *sq. unit*

**6.** Area bounded by $y = x\sin x$ and $x-$axis between $x = 0$ and $x = 2\pi$, is

(A) 0 (B) $2\pi$ *sq. unit*

(C) $\pi$ *sq. unit* (D) $4\pi$ *sq. unit*

**7.** Area under the curve $y = \sin 2x + \cos 2x$ between $x = 0$ and $x = \frac{\pi}{4}$, is

(A) 2 *sq. unit* (B) 1 *sq. unit*

(C) 3 *sq. unit* (D) 4 *sq. unit*

**8.** Area under the curve $y = \sqrt{3x + 4}$ between $x = 0$ and $x = 4$, is

(A) $\frac{56}{9}$ *sq. unit* (B) $\frac{64}{9}$ *sq. unit*

(C) 8 *sq. unit* (D) None of these

**9.** If area bounded by the curves $y^2 = 4ax$ and $y = mx$ is $a^2/3$, then the value of m is

(A) 2 (B) $-2$

(C) $\frac{1}{2}$ (D) None of these

**10.** Area bounded by parabola $y^2 = x$ and straight line $2y = x$ is

(A) $\frac{4}{3}$ (B) 1

(C) $\frac{2}{3}$ (D) $\frac{1}{3}$

**11.** For $0 \le x \le \pi$, the area bounded by $y = x$ and $y = x + \sin x$, is

(A) 2 (B) 4

(C) $2\pi$ (D) $4\pi$

**12.** The area of the region bounded by the $x-$axis and the curves defined by $y = \tan x, (-\pi/3 \le x \le \pi/3)$ is

(A) $\log\sqrt{2}$ (B) $-\log\sqrt{2}$

(C) $2\log 2$ (D) 0

**13.** If a curve $y = a\sqrt{x} + bx$ passes through the point (1, 2) and the area bounded by the curve, line $x = 4$ and *x*-axis is 8 *sq. unit*, then

(A) $a = 3, b = -1$ (B) $a = 3, b = 1$

(C) $a = -3, b = 1$ (D) $a = -3, b = -1$

**14.** If the area above the *x*-axis, bounded by the curves $y = 2^{kx}$ and $x = 0$ and $x = 2$ is $\frac{3}{\ln 2}$, then the value of *k* is

(A) $\frac{1}{2}$ (B) 1

(C) $-1$ (D) 2

**15.** The area bounded by the $x$-axis, the curve $y = f(x)$ and the lines $x = 1, x = b$ is equal to $\sqrt{b^2+1} - \sqrt{2}$ for all $b > 1$, then $f(x)$ is

(A) $\sqrt{x-1}$ (B) $\sqrt{x+1}$

(C) $\sqrt{x^2+1}$ (D) $\dfrac{x}{\sqrt{1+x^2}}$

**16.** The area bounded by the curve $y = f(x)$, $x$-axis and ordinates $x = 1$ and $x = b$ is $\dfrac{5}{24}\pi$, then $f(x)$ is

(A) $3(x-1)\cos(3x+4) + \sin(3x+4)$

(B) $(b-1)\sin(3x+4) + 3\cos(3x+4)$

(C) $(b-1)\cos(3x+4) + 3\sin(3x+4)$

(D) None of these

**17.** The area of the region (in the *square unit*) bounded by the curve $x^2 = 4y$, line $x = 2$ and $x$-axis is

(A) 1 (B) $\dfrac{2}{3}$

(C) $\dfrac{4}{3}$ (D) $\dfrac{8}{3}$

**18.** Area under the curve $y = x^2 - 4x$ within the $x$-axis and the line $x = 2$, is

(A) $\dfrac{16}{3}$ sq. unit

(B) $-\dfrac{16}{3}$ sq. unit

(C) $\dfrac{4}{7}$ sq. unit

(D) Cannot be calculated

**19.** Area bounded by the curve $xy - 3x - 2y - 10 = 0$, $x$-axis and the lines $x = 3, x = 4$ is

(A) $16\log 2 - 13$ (B) $16\log 2 - 3$

(C) $16\log 2 + 3$ (D) None of these

**20.** The area bounded by curve $y^2 = x$, line $y = 4$ and $y$-axis is

(A) $\dfrac{16}{3}$ (B) $\dfrac{64}{3}$

(C) $7\sqrt{2}$ (D) None of these

**21.** The area bounded by the circle $x^2 + y^2 = 4$, line $x = \sqrt{3}y$ and $x$-axis lying in the first quadrant, is

(A) $\dfrac{\pi}{2}$ (B) $\dfrac{\pi}{4}$

(C) $\dfrac{\pi}{3}$ (D) $\pi$

**22.** The area of the triangle formed by the tangent to the hyperbola $xy = a^2$ and co-ordinate axes is

(A) $a^2$ (B) $2a^2$

(C) $3a^2$ (D) $4a^2$

**23.** The area formed by triangular shaped region bounded by the curves $y = \sin x, y = \cos x$ and $x = 0$ is

(A) $\sqrt{2} - 1$ (B) 1

(C) $\sqrt{2}$ (D) $1 + \sqrt{2}$

**24.** The part of straight line $y = x + 1$ between $x = 2$ and $x = 3$ is revolved about $x$-axis, then the curved surface of the solid thus generated is

(A) $37\pi/3$ (B) $7\pi\sqrt{2}$

(C) $37\pi$ (D) $7\pi$

**25.** The area bounded by the curve $y = 4x - x^2$ and the $x$-axis, is

(A) $\dfrac{30}{7}$ *sq. unit* (B) $\dfrac{31}{7}$ *sq. unit*

(C) $\dfrac{32}{3}$ *sq. unit* (D) $\dfrac{34}{3}$ *sq. unit*

**26.** Area of the region bounded by the curve $y = \tan x$, tangent drawn to the curve at $x = \dfrac{\pi}{4}$ and the $x$-axis is

(A) $\dfrac{1}{4}$ (B) $\dfrac{4}{3}$

(C) $\log\sqrt{2} - \dfrac{1}{4}$ (D) None of these

**27.** The area between the curve $y = 4 + 3x - x^2$ and $x$-axis is

(A) 125/6 (B) 125/3

(C) 125/2 (D) None of these

**28.** The area bounded by the curve $y = x$, $x$-axis and ordinates $x = -1$ to $x = 2$ is
(A) 0 (B) 1/2
(C) 3/2 (D) 5/2

**29.** Area inside the parabola $y^2 = 4ax$, between the lines $x = a$ and $x = 4a$ is equal to
(A) $4a^2$ (B) $8a^2$
(C) $28\frac{a^2}{3}$ (D) $35\frac{a^2}{3}$

**30.** The area bounded by $y = -x^2 + 2x + 3$ and $y = 0$ is
(A) 32 (B) $\frac{32}{3}$
(C) $\frac{1}{32}$ (D) $\frac{1}{3}$

**31.** The area of the region bounded by $y = |x - 1|$ and $y = 1$ is
(A) 2 (B) 1
(C) $\frac{1}{2}$ (D) None of these

**32.** The area between the curve $y^2 = 4ax$, $x$-axis and the ordinates $x = 0$ and $x = a$ is
(A) $\frac{4}{3}a^2$ (B) $\frac{8}{3}a^2$
(C) $\frac{2}{3}a^2$ (D) $\frac{5}{3}a^2$

**33.** The area of the curve $xy^2 = a^2(a - x)$ bounded by $y$-axis is
(A) $\pi a^2$ (B) $2\pi a^2$
(C) $3\pi a^2$ (D) $4\pi a^2$

**34.** The area enclosed by the parabolas $y = x^2 - 1$ and $y = 1 - x^2$ is
(A) 1/3 (B) 2/3
(C) 4/3 (D) 8/3

**35.** The area of the smaller segment cut off from the circle $x^2 + y^2 = 9$ by $x = 1$ is
(A) $\frac{1}{2}(9\sec^{-1}3 - \sqrt{8})$ (B) $9\sec^{-1}(3) - \sqrt{8}$
(C) $\sqrt{8} - 9\sec^{-1}(3)$ (D) None of these

**36.** The area of the region bounded by the curves $y = |x - 2|$, $x = 1$, $x = 3$ and the $x$-axis is
(A) 4 (B) 2
(C) 3 (D) 1

**37.** The area enclosed between the parabolas $y^2 = 4x$ and $x^2 = 4y$ is
(A) $\frac{14}{3}$ *sq. unit* (B) $\frac{3}{4}$ *sq. unit*
(C) $\frac{3}{16}$ *sq. unit* (D) $\frac{16}{3}$ *sq. unit*

**38.** The area bounded by the curves $y^2 = 8x$ and $y = x$ is
(A) $\frac{128}{3}$ *sq. unit* (B) $\frac{32}{3}$ *sq. unit*
(C) $\frac{64}{3}$ *sq. unit* (D) 32 *sq. unit*

**39.** The area bounded by the curves $y = \log_e x$ and $y = (\log_e x)^2$ is
(A) $3 - e$ (B) $e - 3$
(C) $\frac{1}{2}(3 - e)$ (D) $\frac{1}{2}(e - 3)$

**40.** The area between the parabola $y^2 = 4ax$ and $x^2 = 8ay$ is
(A) $\frac{8}{3}a^2$ (B) $\frac{4}{3}a^2$
(C) $\frac{32}{3}a^2$ (D) $\frac{16}{3}a^2$

**41.** The area of figure bounded by $y = e^x$, $y = e^{-x}$ and the straight line $x = 1$ is
(A) $e + \frac{1}{e}$ (B) $e - 3$
(C) $e + \frac{1}{e} - 2$ (D) $e + \frac{1}{e} + 2$

**42.** The volume of the solid formed by rotating the area enclosed between the curve $y = x^2$ and the line $y = 1$ about $y = 1$ is (in cubic units)
(A) $9\pi/5$ (B) $4\pi/3$
(C) $8\pi/3$ (D) $7\pi/5$

**43.** The volume of the solid generated by revolving about the *y*-axis the figure bounded by the parabola $y = x^2$ and $x = y^2$ is

(A) $\frac{21}{5}\pi$ (B) $\frac{24}{5}\pi$

(C) $\frac{2}{15}\pi$ (D) $\frac{5}{24}\pi$

**44.** A frustum of sphere is made by cutting two parallel planes of any sphere. If radius of sphere is 5 *cm* and distance between the plane is 1 *cm*, then what will be the curved surface of frustum when the distance of first plane from the centre of sphere is 2 *cm*

(A) $5\pi cm^2$ (B) $10\pi cm^2$

(C) $15\pi cm^2$ (D) $40\pi cm^2$

**45.** The area enclosed by the parabola $y^2 = 4ax$ and the straight line $y = 2ax,$ is

(A) $\frac{a^2}{3}$ *sq. unit* (B) $\frac{1}{3a^2}$ *sq. unit*

(C) $\frac{1}{3a}$ *sq. unit* (D) $\frac{2}{3a}$ *sq. unit*

**46.** The part of circle $x^2 + y^2 = 9$ in between $y = 0$ and $y = 2$ is revolved about *y*-axis. The volume of generating solid will be

(A) $\frac{46}{3}\pi$ (B) $12\pi$

(C) $16\pi$ (D) $28\pi$

**47.** Area bounded by the curve $x^2 = 4y$ and the straight line $x = 4y - 2$ is

(A) $\frac{8}{9}$ *sq. unit* (B) $\frac{9}{8}$ *sq. unit*

(C) $\frac{4}{3}$ *sq. unit* (D) None of these

**48.** The area of the region bounded by the curve $y = x|x|,$ *x*-axis and the ordinates $x = 1,\ x = -1$ is given by

(A) Zero (B) $\frac{1}{3}$

(C) $\frac{2}{3}$ (D) 1

**49.** Area included between the two curves $y^2 = 4ax$ and $x^2 = 4ay,$ is

(A) $\frac{32}{3}a^2$ *sq. unit* (B) $\frac{16}{3}$ *sq. unit*

(C) $\frac{32}{3}$ *sq. unit* (D) $\frac{16}{3}a^2$ *sq. unit*

**50.** If the area bounded by $y = ax^2$ and $x = ay^2,$ $a > 0$, is 1, then $a =$

(A) 1 (B) $\frac{1}{\sqrt{3}}$

(C) $\frac{1}{3}$ (D) None of these