# Shiksha Classes Bhandara

**Mathematics** **Topic : Areas Bounded by Curves** **MM 100**

**Q.1** Area bounded by the curves $y = \sin^{-1}(\sin x)$ and $|y| = \sqrt{\frac{\pi^2}{4} - \left(x - \frac{\pi}{2}\right)^2}$ is –

(A) $\frac{\pi^2}{4}\left(\frac{\pi}{2}+1\right)(\text{unit})^2$ (B) $\frac{\pi^2}{2}\left(\frac{\pi}{2}+1\right)(\text{unit})^2$

(C) $\frac{\pi^2}{2}\left(\frac{\pi}{4}+1\right)(\text{unit})^2$ (D) None of these

**Q.2** The area of the figure bounded by f (x) = sin x, g (x) = cos x in the first quadrant is –

(A) $2(\sqrt{2}-1)$ (B) $\sqrt{3}+1$

(C) $2(\sqrt{3}-1)$ (D) None of these

**Q.3** Area bounded by the parabola $y = x^2 - 2x + 3$ and tangents drawn to it from the point P(1, 0) is equal to

(A) $4\sqrt{2}$ sq. units (B) $\frac{4\sqrt{2}}{3}$ sq. units

(C) $\frac{8\sqrt{2}}{3}$ sq. units (D) $\frac{16}{3}\sqrt{2}$ sq. units

**Q.4** The area bounded by the curve $y = x^2 + 4x + 5$, the axes of co-ordinates & the minimum ordinate is:

(A) $3\frac{2}{3}$ (B) $4\frac{2}{3}$

(C) $5\frac{2}{3}$ (D) none

**Q.5** Area bounded by the curves y = sinx, tangent drawn to it at x = 0 and the line x = π/2, is equal to

(A) $\frac{\pi^2-4}{2}$ sq. units (B) $\frac{\pi^2-4}{4}$ sq. units

(C) $\frac{\pi^2-2}{4}$ sq.units (D) $\frac{\pi^2-2}{2}$ sq. units

**Q.6** The area between the curves $y = \sqrt{x}$ and y = x is

(A) 1/3 (B) 1/6

(C) 2/3 (D) 1

**Q.7** Value of the parameter a such that the area bounded by $y = a^2x^2 + ax + 1$, coordinate axes and the line x = 1, attains it's least value, is equal to

(A) – 1/4 (B) – 1/2

(C) –3/4 (D) –1

**Q.8** Area intercepted by the curves y = cos x, $x \in [0, \pi]$ and y = cos 2x, $x \in [0, \pi]$, is

(A) $\frac{3\pi}{2}$ (B) $\frac{3\sqrt{3}}{2}$

(C) $\frac{3\pi}{4}$ (D) $\frac{3\sqrt{3}}{4}$

**Q.9** A point P moves in xy plane in such a way that [|x|] + [|y|] = 1, where [.] denotes the greatest integer function. Area of the region representing all possible positions of the point P is equal to

(A) 4 sq. units (B) 16 sq. units

(C) $2\sqrt{2}$ sq. units (D) 8 sq. units

**Q.10** The area bounded by the curve y = f (x), the x-axis & the ordinates x =1 & x = b is (b – 1) sin (3b + 4). Then f (x) is:

(A) (x – 1) cos (3x + 4)

(B) sin (3x + 4)

(C) sin (3x + 4) + 3 (x – 1) . cos (3x + 4)

(D) none

**Q.11** The area of the region bounded by the ellipse $\frac{x^2}{a^2}+\frac{y^2}{b^2}=1$ and the ordinates x = ± ae where $b^2 = a^2(1 - e^2)$ and e < 1, is given by –

(A) $2ab\,(e\sqrt{1-e^2}+\sin^{-1}e)$ (B) $2ab\,(e\sqrt{1-e^2}-\sin^{-1}e)$

(C) $ab\,(e\sqrt{1-e^2}-\sin^{-1}e)$ (D) None of these

**Q.12** Area enclosed by the curve y = f (x) defined parametrically as $x=\frac{1-t^2}{1+t^2}$, $y=\frac{2t}{1+t^2}$ is equal to

(A) π sq. units (B) π/2 sq. units

(C) $\frac{3\pi}{4}$ sq. units (D) $\frac{3\pi}{2}$ sq. units

**Q.13** The area bounded by y = |x –1| and y = 3 – | x | is

(A) 4 (B) 3

(C) 2 (D) 5

**Q.14** The area bounded by the curve $x = 2 - y - y^2$ and y-axis is–

(A) 9/2 (B) 7/2

(C) 5/2 (D) None of these

**Q.15** Consider two variable parabolas $y^2 = 4ax$, $x^2 = 4ay$, $a \in [1, 2]$ and A(a) is area bounded by them, then

(A) A(1) is maximum (B) A(2) is maximum

(C) A (3/2) is minimum (D) A(2) is minimum

**Q.16** The area of the loop of the curve $x^2 + (y - 1)y^2 = 0$ is equal to

(A) 8/15 sq. units (B) 2/15 sq. units

(C) 4/15 sq. units (D) none of these

**Q.17** The area bounded by $y = x^3 - 4x$ and x-axis is –

(A) 4 (B) 8

(C) 16 (D) None of these

**Q.18** The smaller of the areas bounded by the curves $x^2 + y^2 = 4$ and $y^2 = 2(x + 2)$ is

(A) $\frac{8}{3} + \pi$ (B) $\frac{16}{3} + 2\pi$

(C) $2\pi - \frac{16}{3}$ (D) $\pi - \frac{8}{3}$

**Q.19** Area bounded by the parabola $x = (y - 2)^2 + 1$, the tangent to it at the point P(2, 3) and the x–axis is equal to

(A) 9 sq. units (B) 6 sq. units

(C) 3 sq. units (D) none of these

**Q.20** The area bounded by y = [x], x-axis and the two ordinates x = 1 and x = 1.7 is –

(A) 17/10 (B) 1

(C) 17/5 (D) 7/10

**For Q.21-Q.25 :**

**The answer to each question is a NUMERICAL VALUE.**

**Q.21** Area bounded by the curves $y = \left[\frac{x^2}{64} + 2\right]$ ( [ . ] denotes the greatest integer function), $y = x - 1$ and $x = 0$ above the x-axis is –

**Q.22** The area bounded by the parabola $(y - 2)^2 = x - 1$, the tangent to it at the point P (2, 3) and the x - axis is equal to

**Q.23** The area bounded by $y = \log_e x$, x-axis and the ordinate $x = e$ is given by –

**Q.24** The area bounded by the curve $y = \sin^{-1}x$ and the lines $x = 0$, $|y| = \pi/2$ is –

**Q.25** The total area enclosed by the lines $y = |x|$, $y = 0$ and $|x| = 1$ is –