

Class: XII  
Subject: Maths  
Topic: Application of Integration  
No. of Questions: 25

Q1. The area enclosed between the curves  $y^2 = 4ax$  and  $x^2 = 4by$  is (a, b > 0)

- A.  $\frac{16a^2}{3}$  sq.units  
B.  $\frac{16b^2}{3}$  sq.units  
C.  $\frac{16ab}{3}$  sq.units  
D. None of these

Q2. The area enclosed between the curves  $y = ax^2$  and  $x = ay^2$  (a > 0) is 1 square unit. Find the value of a.

- A.  $\frac{1}{\sqrt{3}}$   
B.  $\frac{1}{2}$   
C. 1  
D.  $\frac{1}{3}$

Q3. The area bounded by the curves  $y = \sqrt{x}$ ,  $x = 2y + 3$  and x-axis in the first quadrant is equal to

- A.  $2\sqrt{3}$   
B. 18  
C. 9  
D.  $\frac{34}{3}$

Q4. The slope of the tangent at  $(x, y)$  to a curve passing through  $(2, 1)$  is  $\frac{x^2 + y^2}{2xy}$ , then the equation of the curve is

- A.  $2(x^2 - y^2) = 3x$
- B.  $2(x^2 - y^2) = 6y$
- C.  $x(x^2 - y^2) = 6$
- D.  $x(x^2 + y^2) = 10$

Q5. The area of the region bounded by the curves  $y = \cos x$ ,  $y = \sin x$  and the ordinates  $x = 0$ ,  $x = \frac{\pi}{4}$  is

- A.  $\sqrt{2} - 1$
- B.  $\sqrt{2} + 1$
- C.  $\frac{1}{\sqrt{2}}(\sqrt{2} - 1)$
- D.  $\frac{1}{\sqrt{2}}$

Q6. The area bounded by the curve  $y = \sec x$ , x-axis and the lines  $x = 0$  and  $x = \pi/4$  is

- A.  $\log(\sqrt{2} + 1)$
- B.  $\log(\sqrt{2} - 1)$
- C.  $\frac{1}{2} \log 2$
- D.  $\sqrt{2}$

Q7. The area bounded by the curve  $y = 2x - x^2$  and the straight line  $y = -x$  is given by

- A.  $\frac{35}{6}$
- B.  $\frac{43}{6}$
- C.  $\frac{9}{2}$
- D. None of these

Q8. What is the area of the region bounded by the lines  $x = 0$ ,  $x = \frac{\pi}{2}$  and  $f(x) = \sin x$ ,  $g(x) = \cos x$ ?

- A.  $2\left(\frac{\sqrt{2}}{\sqrt{3}} + 1\right)$
- B.  $\frac{\sqrt{3}}{\sqrt{3}} - 1$
- C.  $2\left(\frac{\sqrt{3}}{\sqrt{2}} - 1\right)$
- D.  $2\left(\frac{\sqrt{2}}{\sqrt{2}} - 1\right)$

Q9. The slope of the tangent to a curve  $y = f(x)$  at  $(x, f(x))$  is  $2x + 1$ . If the curve passes through the point  $(1, 2)$ , then the area of the region bounded by the curve, the x-axis and the line  $x = 1$  is

- A.  $\frac{5}{6}$
- B.  $\frac{6}{5}$
- C.  $\frac{1}{6}$
- D. 6

Q10. The area of the figure bounded by the curves  $y = |x - 1|$  and  $y = 3 - |x|$  is

- A. 2
- B. 3
- C. 4
- D. none of these

Q11. What is the area of the figure bounded by the curves  $y^2 = 2x + 1$  and  $x - y = 1$ ?

- A.  $\frac{32}{3}$
- B.  $\frac{4}{3}$
- C.  $\frac{8}{3}$
- D.  $\frac{16}{3}$

Q12. The area bounded by the curve  $y = 2x - x^2$  and the straight line  $y = -x$  is given by

- A.  $9/2$
- B.  $43/6$
- C.  $35/6$
- D. None of these

Q13. The area of the region bounded by  $y = |x - 1|$  and  $y = 1$  is

- A. 1
- B. 2
- C.  $1/2$
- D. None of these

Q14. The area bounded by the curve  $y = x|x|$ , x-axis and the ordinates  $x = 1$ ,  $x = -1$  is given by

- A. 0
- B.  $1/3$
- C.  $2/3$
- D. None of these

Q15. The area lying in the first quadrant and bounded by the circle  $x^2 + y^2 = 4$  and the line  $x = \sqrt{3}y$ , x-axis is

- A.  $\pi$
- B.  $\frac{\pi}{2}$
- C.  $\frac{\pi}{3}$
- D. None of these

Q16. The area under the curve  $y = \sin 2x + \cos 2x$  between  $x = 0$  and  $x = \pi/4$ , is

- A. 2 sq. units
- B. 1 sq. units
- C. 3 sq. units
- D. 4 sq. units

Q17. The area bounded by curve  $xy = c$  and x-axis between  $x = 1$  and  $x = 4$ , is

- A.  $c \log 3$  sq. units
- B.  $2 \log c$  sq. units
- C.  $2c \log 2$  sq. units
- D.  $2c \log 5$  sq. units

Q18. The area of the figure bounded by the curves  $y = e^x$ ,  $y = e^{-x}$  and the straight line  $x = 1$  is

- A.  $e + \frac{1}{e}$
- B.  $e - \frac{1}{e}$
- C.  $e + \frac{1}{e} - 2$
- D. none of these

Q19. The area bounded by the curve  $y = x^3$ , the x-axis and the ordinates  $x = 2$  and  $x = 1$  is

- A. 9
- B.  $15/4$
- C.  $25/4$
- D.  $17/4$

Q20. The area bounded by the curve  $y = \log x$ , the x-axis and ordinate  $x = e$  is

- A.  $e + 1$
- B. 1
- C.  $\infty$
- D. None of these

Q21. Find the area of the region bounded by the parabola  $y = x^2$  and  $y = |x|$  [All India 2013]  
Right Answer Explanation:

Q22. Sketch the graph of  $y = |x + 3|$  and evaluate the area under the curve  $y = |x + 3|$  above x-axis and between  $x = -6$  to  $x = 0$ . [All India 2011]

Q23. Using integration, find the area of the following region

$$\{(x, y, z): |x - 1| \leq y \leq \sqrt{5 - x^2}\}.$$

[Hots; Delhi 2010]

Right Answer Explanation:

Q24. Prove that the curves  $y^2 = 4x$  and  $x^2 = 4y$  divide the area of the square bounded by  $x = 0$ ,  $x = 4$ ,  $y = 4$  and  $y = 0$  into three equal parts.

[Hots; Delhi 2009]

Right Answer Explanation:

Q25. Using integration, find the area of triangular region whose vertices are  $(1, 0)$ ,  $(2, 2)$  and  $(3, 1)$ .

All India 2008]