ABHINAV ACADEMY

UDUPI

CET25M8 APPLICATION OF INTEGRALS

Class 12 - Mathematics

Time Allowed: 1 hour and 30 minutes **Maximum Marks: 63**

1. The area bounded by the curve $y = x^4 - 2x^3 + x^2 + 3$ with x-axis and ordinates corresponding to the minutes of y is **[1]**

   a) 1 b) 4

   c) $\frac{30}{9}$ d) $\frac{91}{30}$

2. The area of the region bounded by the curve $y = x^2$ and the line y = 16 **[1]**

   a) $\frac{128}{3}$ b) $\frac{64}{3}$

   c) $\frac{32}{3}$ d) $\frac{256}{3}$

3. The area enclosed by the parabola $y^2 = 2x$ and its tangents through the point (-2, 0) is **[1]**

   a) 3 b) $\frac{8}{3}$

   c) 2 d) 4

4. If A_n be the area bounded by the curve $y = (\tan x)^n$ and the lines x = 0, y = 0 and $x = \frac{\pi}{4}$, then for x > 2 **[1]**

   a) $A_n - A_{n-2} > \frac{1}{n-1}$ b) $A_n + A_{n-2} \neq \frac{1}{n-1}$

   c) $A_n + A_{n-2} = \frac{1}{n-1}$ d) $A_n - A_{n-2} < \frac{1}{n-1}$

5. If the area bounded by the curve $y^2 = 16x$ and the line y = mx is $\frac{2}{3}$, then m is equal to **[1]**

   a) 3 b) 2

   c) 4 d) 1

6. Let y be the function which passes through (1,2) having slope (2x + 1). The area bounded between the curve and the x-axis is **[1]**

   a) 4 sq. units b) 6 sq. units

   c) $\frac{5}{6}$ sq. units d) $\frac{1}{6}$ sq. units

7. The area bounded by the curves y = |x - 1| and y = 1 is given by **[1]**

   a) 1 b) $\frac{1}{2}$

   c) 2 d) 3

8. The area of the region (in square units) bounded by the curve $x^2 = 4y$, line x = 2 and x-axis is **[1]**

   a) $\frac{8}{3}$ b) 1

   c) $\frac{2}{3}$ d) $\frac{4}{3}$

[1]

9. The area formed by $x^2 + y^2 - 6x - 4y + 12 \leq 0, y \leq x$ and $x \leq \frac{5}{2}$ is

a) $\frac{\pi}{4} - \frac{\sqrt{3}-1}{8}$ b) $\frac{\pi}{6} - \frac{\sqrt{3}+1}{8}$

c) $\frac{\pi}{6} - \frac{\sqrt{3}-1}{8}$ d) $\frac{\pi}{6} + \frac{\sqrt{3}+1}{8}$

10. The area bounded by the parabola $y^2 = 8x$, the x-axis and the latus rectum is **[1]**

a) $\frac{16\sqrt{2}}{3}$ b) $\frac{32}{3}$

c) $\frac{16}{3}$ d) $\frac{23}{3}$

11. The area of the region bounded by the curves y = |x - 2|, x = 1, x = 3 and the x – axis is **[1]**

a) 1 b) 4

c) 2 d) 3

12. Area enclosed between by the curve y^2 (2a - x) = x^3 and the line x = 2a above x-axis is **[1]**

a) $\frac{3}{2}\pi a^2$ b) πa^2

c) $3\pi a^2$ d) $2\pi a^2$

13. The area enclosed by the circle $x^2 + y^2 = 2$ is equal to **[1]**

a) $4\pi^2$ sq units b) 4π sq units

c) 2π sq units d) $2\sqrt{2}\pi$ sq units

14. The area bounded by the curves $y = \sqrt{x}$, 2y + 3 = x and the x-axis in the first quadrant is **[1]**

a) 36 b) 18

c) 9 d) 20

15. The area bounded by the curves $y^2 = 4x$ and y = x is equal to **[1]**

a) $\frac{8}{3}$ b) $\frac{35}{6}$

c) $\frac{39}{6}$ d) $\frac{1}{3}$

16. The area bounded by the curve $\sqrt{x} + \sqrt{y} = 1$ and the coordinate axes is **[1]**

a) $\frac{1}{6}$ b) 1

c) 2 d) $\frac{1}{2}$

17. The area of the region bounded by the circle $x^2 + y^2 = 1$ is **[1]**

a) 2π sq units b) π sq units

c) 3π sq units d) 4π sq units

18. The area of the region bunded by the curves y =|x - 2| , x = 3, x = 1 and the x – axis is **[1]**

a) 1 b) 2

c) 3 d) 4

19. If the area cut off from a parabola by any double ordinate is k times the corresponding rectangle contained by that double ordinate and its distance from the vertex, then k is equal to **[1]**

a) $\frac{2}{3}$ b) 3

c) $\frac{1}{3}$ d) $\frac{3}{2}$

20. The area bounded by the parabola $y^2 = 4ax$, latus rectum and x-axis is **[1]**

a) 0 b) $\frac{2}{3}a^2$

c) $\frac{a^2}{3}$ d) $\frac{4}{3}a^2$

21. The area bounded by the curve y = x (x – 1) (x – 2) and the x-axis is equal to **[1]**

a) $\frac{1}{2}$ sq.units b) 2 sq.units

c) 1 sq.units d) $\frac{1}{4}$ sq.units

22. The area bounded by the lines y = 2 + x , y = 2 – x and x = 2 is **[1]**

a) 16 b) 8

c) 3 d) 4

23. The area bounded by the ellipse $x^2 + 9y^2 = 9$ and the straight line x + 3y = 3 is **[1]**

a) $\frac{4}{3}(\pi - 2)$ b) $\frac{3}{4}(\pi - 2)$

c) 6π d) 9π

24. The area of the region bounded by the curve $x^2 = 4y$ and the straight line x = 4y - 2 is **[1]**

a) $\frac{5}{8}$ sq.units b) $\frac{9}{8}$ sq.units

c) $\frac{3}{8}$ sq.units d) $\frac{7}{8}$ sq.units

25. The area bounded by the parabola $x = 4 - y^2$ and y-axis, in square units, is **[1]**

a) $\frac{33}{2}$ b) $\frac{3}{32}$

c) $\frac{32}{3}$ d) $\frac{16}{3}$

26. The area bounded by the curve $y = 2x - x^2$ and the line x + y = 0 is **[1]**

a) $\frac{35}{6}$ sq. units b) $\frac{19}{6}$ sq. units

c) $\frac{22}{6}$ sq. units d) $\frac{9}{2}$ sq. units

27. The area of the region bounded by the ellipse $\frac{x^2}{25} + \frac{y^2}{16} = 1$is **[1]**

a) $20\pi^2$ sq. units b) 25π sq. units

c) 20π sq. units d) $16\pi^2$ sq. units

28. The area bounded by the parabola $y = x^2$ and the line y = x is **[1]**

a) $\frac{1}{2}$ sq. units b) $\frac{1}{8}$ sq. units

c) $\frac{1}{6}$ sq. units d) $\frac{1}{3}$ sq. units

29. The area bounded by the y-axis, y = cos x and y = sin x when $0 \leq x \leq \frac{\pi}{2}$ is **[1]**

a) $\sqrt{2}$ sq units b) $(\sqrt{2} - 1)$ sq units

c) $(2\sqrt{2} - 1)$ sq units d) $(\sqrt{2} + 1)$ sq units

30. The area between the hyperbola $xy = c^2$, then x – axis and the ordinates at a and b with a > b is : **[1]**

a) $c^2 \log\left(\frac{b}{a}\right)$ b) $c^2 \log(ab)$

c) $c^2 \log(a + b)$ d) $c^2 \log\left(\frac{a}{b}\right)$

31. The area of the region bounded by the curve y = $\sqrt{16-x^2}$ and x-axis is **[1]**

a) 16π sq units

b) 8πsq units

c) 20π sq units

d) 256π sq units

32. The area bounded by the curves y = sin x between the ordinates x = 0, x = π and the x-axis is **[1]**

a) 2 sq. units

b) 4 sq. units

c) 3 sq. units

d) 1 sq. units

33. The area of the region bounded by the parabola $(y - 2)^2 = x - 1$, the tangent to it at the point with the ordinate 3 and the x-axis is **[1]**

a) 6

b) 7

c) 3

d) None of these

34. The area enclosed by the curve $xy^2 = a^2(a - x)$ and the y – axis is **[1]**

a) π

b) 2π

c) πa^2

d) 3π

35. Area of the region bounded by the curve $y^2 = 4x$, y-axis and the line y = 3 is **[1]**

a) $\frac{9}{4}$

b) $\frac{9}{2}$

c) $\frac{9}{3}$

d) 2

36. The area of the region bounded by the curve x = 2y + 3 and the y -axis for y = 1 and y = -1 is **[1]**

a) $\frac{3}{2}$ sq units

b) 6 sq units

c) 8 sq units

d) 4 sq units

37. The area bounded by the curves $y = \sqrt{x}$, $2y + 3 = x$ and the x- axis in the first quadrant is **[1]**

a) 25

b) 9

c) 81

d) 36

38. The area of the region bounded by y = | x - 1| and y = 1 is **[1]**

a) 2

b) $\frac{1}{2}$

c) $\frac{1}{4}$

d) 1

39. The area of the smaller segment cut off from the circle $x^2 + y^2 = 9$ by x = 1 is **[1]**

a) $\frac{1}{2}(9\sec^{-1}(3) - \sqrt{x})$

b) $9\sec^{-1}(3) - \sqrt{8}$

c) $9\sec^{-1}(4) + \sqrt{8}$

d) $\sqrt{8} - 9\sec^{-1}(3)$

40. The area of the region bounded by the parabola $(y - 2)^2 = x - 1$, the tangent to the parabola at the point (2,3) and the x-axis is equal to **[1]**

a) 14 sq. units

b) 6 sq. units

c) 9 sq. units

d) 12 sq. units

41. The area of the region $\{ (x, y) : x^2 + y^2 \leqslant 1 \leqslant x + y \}$ is equal to **[1]**

a) $\frac{\pi-2}{4}$ sq. units

b) $\frac{3\pi-2}{4}$ sq. units

c) $\frac{1}{4}$ sq. units

d) $\frac{1}{2}$ sq. units

42. The area bounded by $y = 2 - x^2$ and $x + y = 0$ is **[1]**

a) $\frac{9}{2}$ sq. units

b) $\frac{7}{2}$ sq. units

c) 7 sq. units

d) 9 sq. units

43. The area bounded by the parabola $y^2 = 4x$ and the line $x + y = 3$ is **[1]**

a) $\frac{16}{3}$

b) $\frac{28}{3}$

c) $\frac{64}{3}$

d) $\frac{32}{3}$

44. The area bounded by the angle bisectors of the lines $x^2 - y^2 + 2y = 1$ and $x + y = 3$ is **[1]**

a) 6 sq. units

b) 3 sq.units

c) 4 sq. units

d) 2 sq. units

45. For which of the following values of m, is the area of the region bounded by the curve $y = x - x^2$ and the line $y = mx$ equal to $\frac{9}{2}$? **[1]**

a) -4

b) 2

c) 0

d) -2

46. The area of the circle $x^2 + y^2 = 16$ exterior to the parabola $y^2 = 6x$ is **[1]**

a) $\frac{4(4\pi-\sqrt{3})}{3}$

b) $\frac{4(4\pi+\sqrt{3})}{3}$

c) $\frac{4(8\pi-\sqrt{3})}{3}$

d) $\frac{4(8\pi+\sqrt{3})}{3}$

47. The area enclosed between the curves $y^2 = x \; and \; y = |x|$ is **[1]**

a) $\frac{5}{3}$sq.units

b) $\frac{1}{6} sq. \; units$

c) $\frac{2}{3} sq. \; units$

d) 1 sq. units

48. Ratio of the area cut off from a parabola by any double ordinate is that of the corresponding rectangle contained by that double ordinate and its distance from the vertex is **[1]**

a) 1 : 2

b) 2 : 3

c) 1 : 3

d) 1 : 1

49. Area lying in the first quadrant and bounded by the circle $x^2 + y^2 = 4$ and the lines $x = 0$ and $x = 2$ is **[1]**

a) π

b) $\frac{\pi}{3}$

c) $\frac{\pi}{4}$

d) $\frac{\pi}{2}$

50. The positive value of the parameter a for which the area of the figure bounded by $y = \sin ax$, $y = 0$, $x = \frac{\pi}{a}$ and $x = \frac{\pi}{3a}$ is 3 is equal to **[1]**

a) $\frac{1}{2}$

b) $\frac{2+\sqrt{3}}{3}$

c) 2

d) 3

51. Area of the region bounded by the curve $y = \cos x$ between $x = 0$ and $x = \pi$ is **[1]**

a) 2 sq units

b) 3 sq units

c) 4 sq units

d) 1 sq units

52. The area bounded by the curve y = f (x), x-axis, and the ordinates x = l and x - b is (b - 1) sin (3b + 4). Then, f (x) is **[1]**

a) sin (3x + 4)

b) sin (3x + 4) + 3 (x -1) cos (3x + 4)

c) sin (3x + 5)

d) (x -1) cos(3x + 4)

53. Area bounded by the curve $y = x^3$, the x-axis and the ordinates x = -2 and x = 1 is **[1]**

a) 2

b) $\frac{17}{4}$

c) 3

d) 6

54. The area bounded by y =| sinx |, the x – axis and the line $|x| = \pi$ is **[1]**

a) 8 sq. units

b) 4 sq. units

c) 6 sq. units

d) 2 sq. units

55. Area of the region in the first quadrant enclosed by the x-axis, the line y = x and the circle $x^2 + y^2 = 32$ is **[1]**

a) 32π sq units

b) 4π sq units

c) 16π sq units

d) 24 sq units

56. The area of the smaller portion of the circle $x^2 + y^2 = 4$ cut off by the line x = 1 is **[1]**

a) $\frac{4\pi-\sqrt{3}}{3}$

b) $\frac{4\pi-3\sqrt{3}}{3}$

c) $\frac{4\pi+\sqrt{3}}{3}$

d) $\frac{4\pi+3\sqrt{3}}{3}$

57. The area of the region bounded by the curve y = sin x between the ordinates x = 0, x = $\frac{\pi}{2}$ and the x-axis is **[1]**

a) 2 sq units

b) 4 sq units

c) 1 sq units

d) 3 sq units

58. The area enclosed by the ellipse $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$ is equal to **[1]**

a) π^2ab

b) πab

c) πab^2

d) $\pi a^2 b$

59. If the area above the x-axis, bounded by the curves $y = 2^{kx}$ and x = 0, and x = 2 is $\frac{3}{\log_e 2}$ then the value of k is **[1]**

a) 1

b) -1

c) 2

d) $\frac{1}{2}$

60. The area bounded by the curve $y = x^2 + 1$ and the line x + y = 3 is **[1]**

a) $\frac{16}{3}$

b) $\frac{9}{2}$

c) $\frac{35}{3}$

d) $\frac{32}{3}$

61. The area between x-axis and curve, y = cos x when $0 \leq x \leq 2\pi$ is **[1]**

a) 3

b) 4

c) 0

d) 2

62. The area enclosed between the curves y = $\sqrt{x}$, $x = 2y + 3$ and the x-axis is **[1]**

a) 36

b) 9

c) 27 d) 18

63. The area bounded by the curve y = x|x|, x-axis and the ordinates x = -1 and x = 1 is given by **[1]**

a) 0 b) $\frac{2}{3}$

c) $\frac{1}{2}$ d) 1