

### 1 Mark Questions

- Evaluate  $\int_2^3 3^x dx$ .
- Evaluate  $\int_0^{\pi/4} \tan x dx$ .
- Evaluate  $\int_0^1 x e^{x^2} dx$ .
- Evaluate  $\int_0^{\pi/4} \sin 2x dx$ .
- Evaluate  $\int_0^1 \frac{1}{\sqrt{1-x^2}} dx$ .
- If  $\int_0^a \frac{1}{4+x^2} dx = \frac{\pi}{8}$ , then find the value of  $a$ .
- If  $f(x) = \int_0^x t \sin t dt$ , then write the value of  $f'(x)$ .
- Evaluate  $\int_2^4 \frac{x}{x^2+1} dx$ .
- Evaluate  $\int_0^3 \frac{dx}{9+x^2}$ .
- Evaluate  $\int_0^{\pi/2} e^x (\sin x - \cos x) dx$ .
- Evaluate  $\int_e^{e^2} \frac{dx}{x \log x}$ .
- Evaluate  $\int_0^1 \frac{\tan^{-1} x}{1+x^2} dx$ .
- Evaluate  $\int_1^2 \frac{x^3-1}{x^2} dx$ .
- Evaluate  $\int_2^3 \frac{1}{x} dx$ .
- Evaluate  $\int_0^2 \sqrt{4-x^2} dx$ .
- Write the value of  $\int_0^1 \frac{e^x}{1+e^{2x}} dx$ .

17. Evaluate  $\int_1^{\sqrt{3}} \frac{dx}{1+x^2}$ .

18. Evaluate  $\int_0^1 \frac{2x}{1+x^2} dx$ .

19. Evaluate  $\int_0^1 \frac{1}{1+x^2} dx$ .

20. Evaluate  $\int_{-\pi/4}^{\pi/4} \sin^3 x dx$ .

21. Write the value of the following integral  $\int_{-\pi/2}^{\pi/2} \sin^5 x dx$ .

### 2 Marks Questions

22. Evaluate  $\int_{-\pi}^{\pi} (1-x^2) \sin x \cdot \cos^2 x dx$ .

23. Evaluate  $\int_{-1}^2 \frac{|x|}{x} dx$ .

### 4 Marks Questions

24. Prove that  $\int_0^a f(x) dx = \int_0^a f(a-x) dx$ ,  
hence evaluate  $\int_0^{\pi} \frac{x \sin x}{1+\cos^2 x} dx$ .

25. Prove that  $\int_0^a f(x) dx = \int_0^a f(a-x) dx$ ,  
and hence evaluate  $\int_0^{\pi/2} \frac{x}{\sin x + \cos x} dx$ .

26. Evaluate  $\int_1^4 (|x-1| + |x-2| + |x-4|) dx$ .

27. Evaluate  $\int_0^{\pi} \frac{x \sin x}{1+\cos^2 x} dx$ .

28. Evaluate  $\int_0^{\pi} \frac{x \tan x}{\sec x + \tan x} dx$ .

29. Evaluate  $\int_{-1}^2 |x^3 - x| dx$ .

30. Evaluate  $\int_0^{\pi} e^{2x} \cdot \sin\left(\frac{\pi}{4} + x\right) dx$ .

31. Evaluate  $\int_{-2}^2 \frac{x^2}{1+5^x} dx$ .

32. Evaluate  $\int_0^{3/2} |x \cos \pi x| dx$

33. Evaluate  $\int_0^{\pi} \frac{x}{1 + \sin \alpha \sin x} dx$ .

34. Evaluate  $\int_{-\pi}^{\pi} (\cos ax - \sin bx)^2 dx$ .

35. Find  $\int_0^{\pi/4} \frac{dx}{\cos^3 x \sqrt{2 \sin 2x}}$ .

36. Evaluate  $\int_{-\pi/2}^{\pi/2} \frac{\cos x}{1 + e^x} dx$ .

37. Evaluate  $\int_0^{\pi/4} \log(1 + \tan x) dx$ .

38. Evaluate  $\int_{\pi/6}^{\pi/3} \frac{\sin x + \cos x}{\sqrt{\sin 2x}} dx$ .

39. Evaluate  $\int_0^{\pi/2} x^2 \sin x dx$ .

40. Prove that  $\int_0^{\pi/2} \frac{\sin^2 x}{\sin x + \cos x} dx = \frac{1}{\sqrt{2}} \log(\sqrt{2} + 1)$ .

41. Evaluate  $\int_2^5 (|x-2| + |x-3| + |x-5|) dx$ .

42. Evaluate  $\int_0^4 (|x| + |x-2| + |x-4|) dx$ .

43. Evaluate  $\int_1^3 (|x-1| + |x-2| + |x-3|) dx$ .

44. Evaluate  $\int_0^{2\pi} \frac{1}{1 + e^{\sin x}} dx$ .

45. Evaluate  $\int_0^1 \frac{x^4 + 1}{x^2 + 1} dx$ .

46. Evaluate  $\int_0^{\pi/2} \frac{x + \sin x}{1 + \cos x} dx$ .

47. Evaluate  $\int_1^2 \frac{5x^2}{x^2 + 4x + 3} dx$ .

48. Evaluate  $\int_0^1 \frac{\log|1+x|}{1+x^2} dx$ .

49. Evaluate  $\int_0^1 \log \left| \frac{1}{x} - 1 \right| dx$ .

50. Evaluate  $\int_0^{\pi} \frac{x}{1 + \sin x} dx$ .

## 6 Marks Questions

51. Find  $\int_1^3 (x^2 + 2 + e^{2x}) dx$  as the limit of sums.

52. Evaluate  $\int_0^{\pi/4} \frac{\sin x + \cos x}{16 + 9 \sin 2x} dx$ .

53. Evaluate  $\int_1^3 (x^2 + 3x + e^x) dx$  as the limit of the sum.

54. Evaluate  $\int_1^3 (3x^2 + 2x + 1) dx$  as the limit of a sum.

55. Evaluate  $\int_0^{\pi/2} \frac{x \sin x \cos x}{\sin^4 x + \cos^4 x} dx$ .

56. Evaluate  $\int_1^3 (e^{2-3x} + x^2 + 1) dx$  as a limit of a sum.

57. Evaluate  $\int_0^{\pi/4} \frac{\sin x + \cos x}{9 + 16 \sin 2x} dx$ .

58. Evaluate  $\int_0^{\pi} \frac{x}{a^2 \cos^2 x + b^2 \sin^2 x} dx$ .

59. Evaluate  $\int_0^{\pi} \frac{x \tan x}{\sec x + \tan x} dx$ .

60. Evaluate  $\int_{\pi/6}^{\pi/3} \frac{dx}{1 + \sqrt{\cot x}}$ .

61. Evaluate  $\int_1^3 (3x^2 + 1) dx$  by the method of limit of sum.

62. Evaluate  $\int_1^3 (2x^2 + 5x) dx$  as a limit of a sum

**63.** Prove that  $\int_0^{\pi/4} (\sqrt{\tan x} + \sqrt{\cot x}) dx = \sqrt{2} \cdot \frac{\pi}{2}$

**64.**  $\int_{\pi/4}^{\pi/2} \cos 2x \cdot \log(\sin x) dx$

**65.** Evaluate  $\int_0^{\pi} \frac{x \tan x}{\sec x \cdot \operatorname{cosec} x} dx.$

**66.** Evaluate  $\int_0^{\pi/2} 2 \sin x \cos x \tan^{-1}(\sin x) dx.$

**67.** Evaluate  $\int_{\pi/6}^{\pi/3} \frac{dx}{1 + \sqrt{\tan x}}.$

**68.** Evaluate  $\int_1^4 (x^2 - x) dx$  as a limit of a sum.

**69.** Evaluate  $\int_0^2 (3x^2 - 2) dx$  as a limit of a sum.

**70.** Evaluate  $\int_0^2 (x^2 - x) dx$  as a limit of a sum.

**71.** Evaluate  $\int_1^3 (2x^2 + 3) dx$  as a limit of a sum.

**72.** Evaluate  $\int_1^2 (x^2 + 5x) dx$  as a limit of a sum

**73.** Evaluate  $\int_1^3 (3x^2 + 2x) dx$  as a limit of a sum.

answers : definite integral-CBSE

1)  $18/\log 3$

2)  $1/2 \log 2$

3)  $1/2 (e^{-1})$

4)  $1/2$

5)  $\pi/2$

6)  $a = 2$

7)  $f'(x) = x \sin x$

8)  $1/2 \log(17/5)$

9)  $\pi/12$

10) 1

11)  $\log 2$

12)  $\frac{\pi^2}{32}$

13) 1

14)  $\log(3/2)$

15)  $\pi$

16)  $\tan^{-1}\left(\frac{e^{-1}}{e+1}\right)$

17)  $\pi/12$

18)  $\log 2$

19)  $\pi/4$

20) 0

21) 0

22) 0

23) 1

24)  $\pi^2/4$

25)  $\frac{\pi}{4\sqrt{2}} \log\left(\frac{\sqrt{2}+1}{\sqrt{2}-1}\right)$

26)  $23/2$

27)  $\pi^2/4$

28)  $\frac{\pi}{2}(\pi-2)$

29)  $1/4$

30)  $\frac{-1}{5\sqrt{2}}(e^{2\pi}+1)$

31)  $8/3$

32)  $\frac{5\pi-2}{2\pi^2}$

33)  $\frac{\pi}{\cos \alpha}(\pi/2 - \alpha)$

34)  $2\pi + \frac{\sin 2a\pi}{2a} - \frac{\sin 2b\pi}{2b}$

35)  $6/5$

36) 1

37)  $\frac{\pi}{8} \log 2$

38)  $2 \sin^{-1}\left(\frac{\sqrt{3}-1}{2}\right)$

39)  $\pi-2$

41)  $23\frac{1}{2}$

42) 20

43) 5

44)  $\pi$

45)  $\frac{3\pi-4}{6}$

46)  $\pi\frac{1}{2}$

47)  $5 - \frac{45}{2} \log\left(\frac{5}{4}\right) + \frac{5}{2} \log\left(\frac{3}{2}\right)$

48)  $\frac{\pi}{8} \log 2$

49) 0

50)  $\pi$

51)  $\frac{38}{3} + \frac{e^6 - e^2}{2}$

52)  $\frac{1}{30} \log 4$

53)  $\frac{62}{3} + e(e^2 - 1)$

54) 36

55)  $\frac{\pi^2}{16}$

56)  $\frac{-e^{-1}(e^{-6} - 1)}{3} + \frac{32}{3}$

57)  $\frac{1}{20} \log 3$

58)  $\frac{\pi^2}{2ab}$

59)  $\frac{\pi}{2}(\pi - 2)$

60)  $\frac{\pi}{12}$

61) 28

62)  $\frac{112}{3}$

63)  $\frac{\pi}{\sqrt{2}}$

64)  $\frac{1}{4} \log 2 - \frac{\pi}{8} + \frac{1}{4}$

65)  $\frac{\pi^2}{4}$

66)  $\frac{\pi}{2} - 1$

67)  $\frac{\pi}{12}$

68)  $\frac{27}{2}$

69) 4

70)  $\frac{2}{3}$

71)  $\frac{70}{3}$

72)  $\frac{59}{6}$

73) 34