MATHS

BOOKS - NCERT MATHS (HINGLISH)

INTEGRALS

Integrals

1. verify that $\int \dfrac{2x-1}{2x+3} dx = x - \log\left|(2x+3)^2\right| + C$

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2. Verify that $\int \dfrac{2x+3}{x^2+3x} dx = \log\left|x^2+3x\right| + c$

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3. $\displaystyle\int \frac{(x^2 + 2)}{x + 1}\, dx$

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4. $\displaystyle\int \frac{e^{6 \log x} - e^{5 \log x}}{e^{4 \log x} - e^{3 \log x}}\, dx$

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5. $\displaystyle\int \frac{(1 + \cos x)}{x + \sin x}\, dx$

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6. $\displaystyle\int \frac{dx}{1 + \cos x}$

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7. $\int \tan^2 x \sec^4 x \, dx$

8. $\int \dfrac{\sin x + \cos x}{\sqrt{1 + \sin 2x}} \, dx$

A. $\dfrac{x^2}{5} + C$

B. $x + C$

C. $2x + C$

D. $x^2 + C$

Answer: B

9. $\int \sqrt{1 + \sin x}\, dx$

10. $\int \dfrac{x}{\sqrt{x} + 1}\, dx$

11. $\int \sqrt{\dfrac{a + x}{a - x}}\, dx$

12. Evaluate: $\int \dfrac{x^{1/2}}{1 + x^{3/4}}\, dx$

13. $\int \dfrac{\sqrt{1+x^2}}{x^4}\,dx$

14. $\int \dfrac{dx}{\sqrt{16-9x^2}}$

15. $\int \dfrac{dt}{\sqrt{3t-2t^2}}$

16. $\int \dfrac{3x-1}{\sqrt{x^2+9}}\,dx$

17. $\int \sqrt{5 - 2x + x^2}\, dx$

18. $\int \dfrac{x}{x^4 - 1}\, dx$

A. $\dfrac{1}{6} \cdot \log\left|\dfrac{x^2 + 1}{x^2 - 1}\right| + C$

B. $\dfrac{1}{6} \cdot \log\left|\dfrac{x^2 - 1}{x^2 + 1}\right| + C$

C. $\log\left|\dfrac{x^2 - 1}{x^2 + 1}\right| + C$

D. $\dfrac{1}{4} \cdot \log\left|\dfrac{x^2 - 1}{x^2 + 1}\right| + C$

Answer: D

19. $\displaystyle\int \frac{x^2}{1 - x^4}\, dx$

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20. Evaluate: $\displaystyle\int \sqrt{2ax - x^2}\, dx$

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21. $\displaystyle\int \frac{\sin^{-1} x}{(1 - x^2)^{\frac{3}{2}}}\, dx$

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22. $\displaystyle\int \frac{\cos 5x + \cos 4x}{1 - 2\cos 3x}\, dx$

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23. $\displaystyle\int \frac{\sin^6 x + \cos^6 x}{\sin^2 x \cos^2 x} dx$

24. Find $\displaystyle\int \frac{\sqrt{x}}{\sqrt{a^3 - x^3}} dx$

25. $\displaystyle\int \frac{\cos x - \cos 2x}{1 - \cos x} dx$

A. $2\sin x + x + C$

B. $2\sin x - x + C$

C. $\cos x + x + C$

D. $2\cos x + x + C$

Answer: A

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26. $\int \dfrac{1}{x\sqrt{x^4 - 1}}dx$

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27. Evaluate $\displaystyle\int_0^2 (x^2 + 3)dx$ as limit of sums.

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28. $\displaystyle\int_0^2 e^x\, dx$

29. $\displaystyle\int_0^1 \frac{dx}{e^x + e^{-x}}$

30. $\displaystyle\int_0^{\pi/2} \frac{\tan x}{1 + m^2 \tan^2 x}\, dx$

31. Evaluate : $\displaystyle\int \frac{dx}{\sqrt{(x-1)(2-x)}}$ by the substitution $x = 1 + \sin^2 \theta$. Hence, find the value of $\displaystyle\int_1^2 \frac{dx}{\sqrt{(x-1)(2-x)}}$

A. $\dfrac{\pi}{2}$

B. $\dfrac{\pi}{4}$

C. π

D. 2π

Answer: C

32. $\int_0^1 \dfrac{x}{\sqrt{1+x^2}} dx$

A. $-\sqrt{2} - 1$

B. $\sqrt{2} + 1$

C. $-\sqrt{2} + 1$

D. $\sqrt{2} - 1$

Answer: D

33. $\int_0^\pi x \sin x \cos^2 x \ dx$

34. Evaluate: $\displaystyle\int_0^{1/2} \frac{1}{(1+x^2)\sqrt{1-x^2}}$

35. Evaluate: $\displaystyle\int \frac{x^2}{x^4 - x^2 - 12}\,dx$

36. Evaluate: $\displaystyle\int \frac{x^2}{(x^2 + a^2)(x^2 + b^2)}\,dx$

37. If $\displaystyle\int_{\frac{\pi}{4}}^{\frac{3\pi}{4}} \frac{x}{1+\sin x}\, dx = k(\sqrt{2}-1)$, then k= (A) 0 (B) π (C) 2π

(D) none of these

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38. Evaluate: $\displaystyle\int \frac{2x-1}{(x-1)(x+2)(x-3)}\, dx$

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39. $\displaystyle\int e^{\tan^{-1}x}\left(1 + \frac{x}{1+x^2}\right) dx$

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40. $\displaystyle\int \sin^{-1}\sqrt{\frac{x}{a+x}}\, dx$

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41. $\displaystyle\int_{\pi/3}^{\pi/2} \frac{\sqrt{1+\cos x}}{(1-\cos x)^{5/2}}\, dx$

42. $\displaystyle\int e^{-3x}\cos^3 x\, dx$

43. $\displaystyle\int \sqrt{\sqrt{\tan x}}\cdot dx$

44. Evaluate: $\displaystyle\int_{0}^{\pi/2} \frac{1}{\left(a^2\cos^2 x + b^2\sin^2 x\right)^2}\, dx$

45. Evaluate : $\int_0^1 x \log(1 + 2x)dx$

46. $\int_0^\pi x \log \sin x \ dx$

47. Prove that $\int_{-\pi/4}^{\pi/4} \log(\sin x + \cos x) \ dx = -\dfrac{\pi}{4} \log 2.$

48. Evaluate: $\int \dfrac{\cos 2x - \cos 2\theta}{\cos x - \cos \theta} dx$

A. $2(\sin x + x \cos \theta) + C$

B. $2(\sin x - x \cos \theta) + C$

C. $2(\sin x + 2x \cos \theta) + C$

D. $2(\sin x - 2x \cos \theta) + C$

Answer: A

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49. $\int \dfrac{dx}{\sin(x-a)\sin(x-b)}$

A. $\dfrac{1}{\sin(b-a)}\log\left|\dfrac{\sin(x-b)}{\sin(x-a)}\right| + C$

B. $\cos ec(b-a)\log\left|\dfrac{\sin(x-a)}{\sin(x-b)}\right| + C$

C. $\cos ec(b-a)\log\left|\dfrac{\sin(x-b)}{\sin(x-a)}\right| + C$

D. $\sin(b-a)\log\left|\dfrac{\sin(x-a)}{\sin(x-b)}\right| + C$

Answer: A

50. $\int \tan^{-1} \sqrt{x} \, dx$ is equal to

A. $(x+1)\tan^{-1} \sqrt{x} - \sqrt{x} + C$

B. $x \tan^{-1} \sqrt{x} - \sqrt{x} + C$

C. $\sqrt{x} - x \tan^{-1} \sqrt{x} + C$

D. $\sqrt{x} - (x+1)\tan^{-1} \sqrt{x} + C$

Answer: A

51. $\int \dfrac{x^9}{(4x^2+1)^6} \, dx$ is equal to

A. $\dfrac{1}{5x}\left(4 + \dfrac{1}{x^2}\right)^{-5} + C$

B. $\dfrac{1}{5}\left(4 + \dfrac{1}{x^2}\right)^{-5} + C$

C. $\dfrac{1}{10x}(1 + 4x)^{-5} + C$

D. $\dfrac{1}{10}\left(\dfrac{1}{x^2} + 4\right)^{-5} + C$

Answer: D

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52.   If

$$\int \dfrac{dx}{(x + 2)(x^2 + 1)} = a\log|1 + x^2| + b\tan^{-1}x + \dfrac{1}{5}\log|x + 2| + C$$

, then

A. $a = \dfrac{-1}{10}, b = \dfrac{-2}{5}$

B. $a = \dfrac{1}{10}, b = -\dfrac{2}{5}$

C. $a = \dfrac{-1}{10}, b = \dfrac{2}{5}$

D. $a = \dfrac{1}{10}$, $b = \dfrac{2}{5}$

Answer: A

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53. $\displaystyle\int \dfrac{x^3}{x+1}dx$ is equal to:

A. $x + \dfrac{x^2}{2} + \dfrac{x^3}{3} - \log|1 - x| + C$

B. $x + \dfrac{x^2}{2} - \dfrac{x^3}{3} - \log|1 - x| + C$

C. $x - \dfrac{x^2}{2} - \dfrac{x^3}{3} - \log|1 + x| + C$

D. $x - \dfrac{x^2}{2} + \dfrac{x^3}{3} - \log|1 + x| + C$

Answer: A

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54. $\int \dfrac{x + \sin x}{1 + \cos x}\, dx$ is equal to

  A. $\log|1 + \cos x| + C$

  B. $\log|x + \sin x| + C$

  C. $x - \tan' \dfrac{x}{2} + C$

  D. $x.\tan' \dfrac{x}{2} + C$

Answer: A

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55. $\int \dfrac{x^3 dx}{\sqrt{1 + x^2}} = a\left(1 + x^2\right)^{3/2} + b\sqrt{1 + x^2} + C$, then

  A. $a = \dfrac{1}{3}, b = 1$

  B. $a = \dfrac{-1}{3}, b = 1$

  C. $a = \dfrac{-1}{3}, b = -1$

D. $a = \dfrac{1}{3}, b = -1$

Answer: A

56. $\displaystyle\int_{-\frac{\pi}{4}}^{\frac{\pi}{4}} \dfrac{dx}{1 + \cos 2x}$ is

A. 1

B. 2

C. 3

D. 4

Answer: A

57. Prove that : $\int_0^{\frac{\pi}{2}} \sqrt{1 - \sin 2x}\, dx = 2(\sqrt{2} - 1)$

A. $2\sqrt{2}$

B. $2(2 + \sqrt{2})$

C. 2

D. $2(\sqrt{2} - 1)$

Answer: A

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58. $\int_0^{\pi/2} \cos x\, e^{\sin x}\, dx$ is equal to

A. $e + 1$

B. $e - 1$

C. e

D. $-e$

Answer: A

59. $\int \dfrac{x+3}{(x+4)^2} e^x \, dx$ is equal to

A. $e^x \left(\dfrac{1}{x+4} \right) + C$

B. $e^{-x} \left(\dfrac{1}{x+4} \right) + C$

C. $e^{-x} \left(\dfrac{1}{x-4} \right) + C$

D. $e^{2x} \left(\dfrac{1}{x-4} \right) + C$

Answer: A

60. If $\displaystyle\int_0^a \frac{1}{1 + 4x^2}\,dx = \frac{\pi}{8}$, then $a =$

61. $\displaystyle\int \frac{\sin x}{3 + 4\cos^2 x}\,dx$

62. The value of $\displaystyle\int_{-\pi}^{\pi} \sin^3 x \cos^2 x\,dx$ is