



MATHS

BOOKS - KC SINHA MATHS (HINGLISH)

DEFINITE INTEGRALS - FOR BOARDS

Solved Examples

1. Find $\int_0^1 (4x^3 + 3x^2 - 2x + 1) dx$



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2. Evaluate: $\int_0^{\pi/4} \sqrt{1 + \sin 2x} dx$ (ii)

$$\int_0^{\pi/4} \sqrt{1 - \sin 2x} dx$$



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3. Evaluate: $\int_0^{\frac{\pi}{2}} \cos^3 x dx$



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4. Evaluate: $\int_0^{\frac{\pi}{2}} \sin^4 x dx$





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5. Find $\int_0^{\frac{\pi}{2}} \frac{dx}{1 + \sin x}$



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6. Find $\int_0^1 \frac{dx}{\sqrt{x+1} + \sqrt{x}}$



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7. Evaluate $\int_0^{\sqrt{2}} \sqrt{2 - x^2} dx$



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8. Evaluate: $\int_0^4 \frac{1}{\sqrt{x^2 + 2x + 3}} dx$



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



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10. If $\int_0^a \sqrt{x} dx = 2a \int_0^{\pi/2} \sin^3 x dx$ find the value of integral $\int_a^{a+1} x dx$.



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11. Find the value of $\int_0^{\frac{\pi}{2}} \frac{\cos x}{(1 + \sin x)^2} dx$



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12. Find $\int_0^a \sqrt{a^2 - x^2} dx$





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13. Evaluate $\int_0^1 \sqrt{\frac{1-x}{1+x}} dx$



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14. Evaluate $\int_{\frac{1}{3}}^1 \frac{(x - x^3)^{\frac{1}{3}}}{x^4} dx$



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15. Evaluate $\int_1^e \frac{\cos(\log_e x)}{x} dx$



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16. The value of the integral

$$\int_{\alpha}^{\beta} \frac{1}{\sqrt{(x - \alpha)(\beta - x)}} dx$$



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17. Evaluate: $\int_0^{\frac{1}{2}} \frac{\sin^{-1} x}{(1 - x^2)^{\frac{3}{2}}} dx$



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18. Evaluate: $\int_0^1 \sin^{-1} \left(\frac{2x}{1+x^2} \right) dx$



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19. $\int_0^{\frac{\pi}{4}} 2 \tan^3 x dx = 1 - \log 2$



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20. Evaluate the definite integrals

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



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21. Evaluate the definite integrals

$$\int_0^{\pi} \frac{\sin x + \cos x}{4(9 + 16 \sin 2x)} dx$$



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



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23. Evaluate: $\int_0^{\frac{\pi}{2}} \frac{1}{2 \cos x + 4 \sin x} dx$



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24. Find $\int_0^{\pi} x \sin^2 x dx$



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25. Evaluate $\int_0^{\frac{\pi}{2}} \sin 2x \tan^{-1}(\sin x) dx$



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26. Evaluate $\int \frac{xe^x}{(1+x)^2} dx$



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27. Evaluate $\int_{\frac{\pi}{3}}^{\frac{\pi}{2}} e^x \left(\frac{1 + \sin x}{1 + \cos x} \right) dx$



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28. Find the value of the following: $\int_2^3 x^2 dx$



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Exercise

1. Find $\int_0^{\frac{\pi}{2}} \frac{\cos x}{(1 + \sin x)(2 + \sin x)} dx$



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2. Find the value of the following: $\int_2^3 \frac{1}{x} dx$



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3. Find the value of the following:

$$\int_{-1}^1 (x + 1) dx$$



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4. Evaluate the definite integrals

$$\int 12(4x^3 - 5x^2 + 6x + 9) dx$$



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5. Find the value of the following: $\int_0^1 \frac{dx}{1+x^2}$



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6. Find the value of the following:

$$\int_0^1 \frac{dx}{\sqrt{1 - x^2}}$$



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7. Find the value of the following: $\int_4^5 e^x dx$



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8. Find the value of the following: $\int_0^{\frac{\pi}{4}} \tan x dx$



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9. Find the value of the following:

$$\int_{\frac{\pi}{6}}^{\frac{\pi}{4}} \cos ex dx$$



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10. Find the value of the following:

$$\int_0^{\frac{2}{3}} \frac{dx}{4 + 9x^2}$$



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11. Evaluate the following definite integral:

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



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12. Evaluate the definite integrals

$$\int_0^{\pi/4} (2\sec^2 x + x^3 + 2) dx$$



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13. Find the value of the following:

$$\int_0^{\pi} \left(\sin^2\left(\frac{x}{2}\right) - \cos^2\left(\frac{x}{2}\right) \right) dx$$



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14. Find the value of the following:

$$\int_0^1 \left(x^{\frac{1}{3}} + 1 \right)^2 dx$$



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15. Find the value of the following:

$$\int_0^7 \sqrt{9 + x} dx$$



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16. Find the value of Q, where

$$Q = \frac{8B}{\sqrt{H}} \int_0^H (H - h) \sqrt{h} (dh)$$



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17. Find the value of the following:

$$\int_0^{\frac{\pi}{4}} \frac{1 + \sin 2x}{\cos x + \sin x} dx$$



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18. Find the value of the following:

$$\int_0^{\frac{\pi}{6}} \cos x \cos 2x dx$$



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19. Evaluate: $\int \cos^3 3x dx$



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20. Find the value of the following:

$$\int_{\frac{\pi}{4}}^{\frac{\pi}{2}} \cos e c^2 \theta \cos \theta d\theta$$



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21. Evaluate the definite integrals

$$\int_0^{\frac{\pi}{2}} \cos 2x dx$$



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22. If $I = \int_0^{\frac{\pi}{4}} \frac{dx}{1 + \cos 2x}$

Find the value of $2I$



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23. Find the value of the following:

$$\int_0^{\frac{\pi}{2}} \sqrt{1 + \cos x} dx$$



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24. Find the value of the following:

$$\int_0^{\frac{\pi}{4}} \frac{dx}{1 - \sin x}$$



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25. Find the value of the following:

$$\int_0^{\frac{\pi}{2}} \sqrt{1 + \cos x} dx$$



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26. $\int_{-1}^0 \frac{dx}{\sqrt{3x + 4} - \sqrt{3x + 9}}$



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$$27. \int_0^{\frac{\pi}{2}} (1 + \sin x)^3 \cos x dx$$



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$$28. \int_0^{\frac{\pi}{2}} (a + b \sin \theta)^3 \cos \theta d\theta$$



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$$29. \int_0^{\frac{\pi}{2}} \frac{\cos x}{1 + \sin x} dx$$



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$$30. \int_0^{\frac{\pi}{4}} \sin^3 2t \cos 2t dt$$



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$$31. \int_0^{\frac{\pi}{2}} \sqrt{\sin \theta} \cos^5 \theta d\theta$$



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$$32. \int_0^{\frac{\pi}{2}} \sin x \cos^3 x dx$$



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$$33. \int_0^{\frac{\pi}{3}} \frac{\sec x \tan x}{1 + \sec^2 x} dx$$



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$$34. \int_0^{\frac{\pi}{2}} \frac{\cos x}{\sqrt{1 + \sin x}} dx$$



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



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$$36. \int_0^{\frac{\pi}{2}} \cos^5 x dx$$



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$$37. \int_0^{\frac{\pi}{2}} \sin^2 x \cos^2 x dx$$



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$$38. \int_0^{\frac{\pi}{4}} \tan^3 x \sec^2 x dx$$



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$$39. \int_0^{\frac{\pi}{4}} \sec^4 x dx$$



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$$40. \int_0^{\frac{\pi}{4}} \tan^3 x dx$$



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$$41. \int_0^{\frac{\pi}{4}} (\tan x - x) \tan^2 x dx$$



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$$42. \int_0^{\pi} \frac{\tan x}{\sin x + \tan x} dx$$



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$$43. \int_2^4 \frac{6x^2 - 1}{\sqrt{2x^3 - x - 2}} dx$$





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$$44. \int_0^1 \frac{dx}{\sqrt{1-x^2}}$$



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$$45. \int_0^2 x\sqrt{x+2}dx$$



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$$46. \int_2^3 \frac{x}{x^2+1}dx$$



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



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$$48. \int_0^1 xe^{x^2} dx$$



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$$49. \int_0^1 (2x^2 - 3)^n x dx$$



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$$50. \int_9^1 x^3 \sqrt{1 + 3x^4} dx$$



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$$51. \int_{\frac{1}{2}}^1 \frac{dx}{x^2 \sqrt{1 - x^2}}$$



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$$52. \int_0^1 \frac{\tan^{-1} x}{1+x^2} dx$$



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$$53. \int_0^1 \frac{e^{-x}}{1+e^x} dx$$



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$$54. \int_1^2 \frac{\sqrt{\log x}}{x} dx$$



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$$55. \int_0^{\frac{1}{2}} \frac{e^{\sin^{-1} x}}{\sqrt{1 - x^2}} dx$$



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$$56. \int_0^{\pi} x \cos^2 x dx$$



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$$57. \int_0^{\frac{\pi}{2}} x \sin x \sin 2x dx$$



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$$58. \int_0^{\frac{\pi}{2}} x^2 \sin x dx$$



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$$59. \int_1^{\sqrt{e}} x \log x dx$$



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$$60. \int_0^1 \tan^{-1} x dx$$



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$$61. \int_0^1 x^2 e^x dx$$



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$$62. \int_0^{\frac{\pi}{2}} e^{-x} \cos x dx$$



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$$63. \int_a^b \frac{\log x}{x^2} dx$$



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$$64. \int_1^2 \frac{x}{(x+1)(x+2)} dx$$



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$$65. \int_0^a \left(\sqrt{a^2 - x^2} + xe^x \right) dx$$



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$$66. \int_1^2 \frac{dx}{x(1+x^2)}$$



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