



MATHS

BOOKS - ARIHANT PRAKASHAN

INTEGRATION

Topic 1 Practise Questions 1 Mark Questions

1. What do you mean by integration ? Write your answer in one sentence.

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2. integrate $\int \frac{3 + \cos x + \tan^2 x}{2x + \sin x + \tan x}$

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3. Evaluate $\int \frac{\cot x}{\ln \sin x} dx$

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4. Integrate $\int \frac{dx}{\cos^2 x \cdot \sin^2 x}$

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5. What is the value of $\int \frac{d}{dx} f(x) dx - \frac{d}{dx} \int f(x) dx$?

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6. Evaluate $\int e^{\ln(\cos e^{cx} - \cot^2 x)} dx$

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7. Evaluate $\int \frac{\sec x \cos e^{cx}}{\ln \tan x} dx$



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8. Write the value of

$$u \int v dx - \int u \cdot \left\{ \left(\int v dx \right) \right\} dx - v \int u dx + \int v \cdot \left\{ \left(\int u dx \right) \right\} dx$$



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9. Write a primitive of $(\sin x + \cos x)$.



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10. Evaluate $\int e^{\ln \cos x} dx$



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11. Evaluate $\int \frac{\sin x}{\cos^{11} x} dx$



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12. Evaluate $\int \frac{dx}{\sqrt{2x - x^2}}$

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13. Find an anti derivative of $e^x(\tan x + \ln \sec x)$.

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14. Evaluate $\int \tan^{-1} x dx$.

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15.

$$\int \sin x \cos x dx = \int \sin x d(\sin x) = \frac{\sin^2 x}{2} + C_1 \quad \text{and} \quad \int \sin x \cos x dx = -\int \cos x d(\cos x) = -\frac{\cos^2 x}{2} + C_2$$

where C_1 and C_2 are constants. Explain the double answer of the same integral.

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16. What is the value of $\int \frac{1 + \frac{1}{x^2}}{x - \frac{1}{x} + 4} dx$

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17. Evaluate $\int \frac{3dx}{(x - 1)(x + 2)}$

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18. What is the value of $\int e^x \cos x dx + \int e^x \sin x dx$?

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19. $\int 2 \sin(\alpha - \beta)x \sin(\alpha + \beta)x dx$

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20. Evaluate $\int \left(\sqrt{a^2 - x^2} + \frac{1}{\sqrt{a^2 - x^2}} \right) dx$

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21. Evaluate $\int (\cot x - \cos ex) dx$

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22. Evaluate $\int 2e^{\ln x} dx$.

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23. Evaluate $\int x dx$

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24. Evaluate $\int \sin^2 x d(\sin x)$.



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25. Evaluate $\int \tan^2 x dx - \int \sec^2 x dx$



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26. Evaluate $\int 2^x dx$



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27. Evaluate $\int \frac{1 + \cot x}{x + \log \sin x} dx$



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28. Evaluate $\int x^2 \sin x^3 dx$



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29. Evaluate $\int e^{\log \sin x} \cos x dx$.

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30. Evaluate $\int \left(\frac{1}{x} - \frac{1}{x^2} \right) dx$

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Topic 1 Practise Questions 4 Mark Questions

1. Evaluate $\int \frac{(2x + 1)dx}{(x^2 + x + 29)}$

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

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3. $\int \left(e^{4x} \frac{dx}{e^{4x} - 5} \right)$

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4. Evaluate $\int x \tan^{-1} x dx$

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5. If $f'(x) = e^x + \frac{1}{1+x^2}$ and $f(0) = 1$, then find $f(x)$.

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6. Evaluate $\int \frac{x+3}{(x+3)^2} dx$

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7. Evaluate $\int \frac{\sin x \cos x}{\sin^2 x - 2 \sin x + 3} dx$



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8. Evaluate $\int (\log x)^2 dx$



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9. Evaluate $\int \frac{dx}{x \ln(x) \sqrt{(\ln(x))^2 - 4}}$



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10. Evaluate $\int \frac{dx}{x^{\frac{1}{2}} + x^{\frac{1}{3}}}$



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11. Evaluate: $\int \frac{x e^x}{(x + 1)^2} dx$



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12. Evaluate $\int \frac{\sin 6x + \sin 4x}{\cos 6x + \cos 4x} dx$

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13. Evaluate $\int \frac{dx}{x [(\log x)^2 + 25]}$

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14. Evaluate $\int \sin^{-1} x dx$

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15. Evaluate $\int \tan^{-1} \sqrt{\frac{1-x}{1+x}} dx$

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16. Evaluate $\int \frac{e^x - 1}{e^x + 1} dx$

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17. Evaluate $\int \sin^4 x \cos^3 x dx$

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18. Evaluate $\int x^2 \sin x dx$

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19. Evaluate $\int \frac{\cos x}{\sin^2 x + \sin x} dx$

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20. Evaluate $\int \frac{\cos 3x \cos x}{1 + \cos 2x} dx$



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21. Evaluate $\int e^x (\cot x + \ln \sin x) dx$



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22. Evaluate $\int \frac{dx}{\sqrt{4 + 4x + x^2}}$



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23. Evaluate $\int x e^{-x^2} dx$



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24. Evaluate $\int \frac{4x - 5}{x^2 - x - 2} dx$



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25. Evaluate $\int \frac{e^x \sin e^x}{\sqrt{16 + \cos^2 e^x}} dx$

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26. Evaluate $\int \sqrt{1 + 2x + x^2} dx$

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27. Evaluate $\int \frac{x^3}{x^4 - x^2 - 2} dx$

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28. $\int (x^2 + 2x + 7) \sqrt{x + 1} dx$

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29. Evaluate $\int \frac{\sin 4x + \cos 2x}{\sin 4x \cos 2x} dx$



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30. $\int \frac{2x + 5}{(x + 2)^{\frac{7}{2}}} dx$



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31. Evaluate $\int \frac{dx}{\sqrt{(16 + x^2 - 8x)}}$



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32. Evaluate $\int \frac{3x dx}{(x - 4)(x + 2)}$



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33. Evaluate $\int \frac{dx}{1 + \sin x}$



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34. Evaluate $\int \frac{\cos^5 x}{\sin x} dx$

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35. $\int \sec \theta \tan \theta \sqrt{\tan^2 \theta - 3} d\theta$

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36. Evaluate $\int \sin^{-1} x dx$

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37. Evaluate $\int e^x \cos x dx$

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38. Evaluate $\int \frac{x^5}{x^3 + 1} dx$



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39. Evaluate $\int (dx)/(3e^x - 1)$



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40. Evaluate $\int \cos x^7 dx$



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41. Evaluate $\int \frac{dx}{\sin x - \cos x}$



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42. Integrate : $\int \frac{x + 1}{(x + 2)^2} e^x dx$



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43. Evaluate $\int \frac{\sin^{-1} x}{\sqrt{1-x^2}} dx$

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44. Evaluate $\int \frac{e^x + e^{-x} + 1}{e^x - e^{-x} + x} dx$

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45. Evaluate $\int \frac{\sin x}{\sin(x+a)} dx$

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46. Evaluate $\int \left[\frac{1}{\log x} - \frac{1}{(\log x)^2} \right] dx$

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47. Evaluate $\int \frac{\cos^3 x}{\sin^4 x} dx$

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48. Evaluate $\int (x + 1) \frac{dx}{\sqrt{x^2 + 2x - 3}}$

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49. Evaluate $\int \frac{x^7}{x + 1} dx$

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50. Evaluate $\int \frac{x^2 \tan^{-1} x^3}{1 + x^6} dx$

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51. Evaluate $\int \sec^3 x \tan x dx$

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52. Evaluate $\int \frac{\sqrt{x+3}}{x+1} dx$

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53. Evaluate $\int \frac{dx}{3 \sin^2 x + 2 \cos^2 x}$

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54. Evaluate $\int \cot^2 x \cos e c^4 x dx$

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55. Evaluate $\int \sin^3 x \sec^{14} x dx$



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56. Evaluate $\int \frac{\sec^2 \theta}{\sqrt{3 \tan^2 \theta - 1}} d\theta$



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57. Integrate the following $\int \frac{x^2 + 2x + 4}{(x + 1)\sqrt{x^2 + 2x - 3}}$



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58. Integrate the following $\int \frac{x^2 + 2x + 2}{x\sqrt{x^2 - 4}} dx$



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59. Evaluate $\int \frac{e^x}{x} (1 + x \ln x) dx$



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60. Evaluate $\int \log(1 + x^2) dx$

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61. Evaluate $\int \cos x^7 dx$

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62. Evaluate $\int e^x \left(\frac{1 + \sin x}{1 + \cos x} \right) dx.$

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Topic 1 Practise Questions 6 Mark Questions

1. Evaluate $\int (2 \cos^2 x + 3 \cos x) dx$

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2. Evaluate $\int \frac{2 \cos x}{4 - \sin x} dx$

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3. Evaluate the following integrals $\int \frac{dx}{\cos x + (1 + 2 \sin x)}$

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4. Evaluate $\int \frac{12 \sin x - 2 \cos x + 3}{\sin x + \cos x} dx$

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5. $\int \frac{1 + x^2}{x \sqrt{x^4 + 1}} dx$

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6. Evaluate $\int x^2 (\sin^2 x + \cos^2 x) dx$

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7. Evaluate $\int \frac{dx}{(x-2)\sqrt{3x^2-16x-24}}$

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8. Evaluate $\int \frac{dx}{(x+1)\sqrt{1-x^2}}$

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9. Evaluate $\int e^{3x} \sin 4x dx$

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10. Evaluate $\int \frac{\cos x}{\sin 2x} dx$



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11. Evaluate $\int \frac{(2x + 1)dx}{(x^2 + x + 29)}$



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12. Evaluate $\int \frac{12 \sin x - \cos x + 3}{\sin x + \cos x + 1} dx$



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13. Evaluate $\int x^3 \cos^2 x dx$



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14. Evaluate $\int \frac{dx}{2 \sin x + \cos x + 3}$



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15. Evaluate $\int \frac{4x^2 + x + 1}{(x^3 - 1)} dx$

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16. Evaluate $\int \frac{dx}{x^4 - 1}$

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17. Evaluate $\int \frac{dx}{(x + 1)\sqrt{1 - x^2}}$

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18. Evaluate $\int \frac{dx}{3 + \sin x}$

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1. Evaluate $\int \frac{(x + x^2)(1 - x)}{x^4} dx$

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2. Evaluate $\int \sin x e^{\cos x} dx$

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3. Evaluate $\int x \sin x \cos x dx$

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4. Evaluate $\int \frac{3x + 2}{\sqrt{9x^2 + 12x - 5}} dx$

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5. Find $\int \frac{2x^2 + x + 3}{(x^2 + 2)(x - 1)} dx$

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6. Evaluate $\int \frac{dx}{x \sqrt{(\ln x)^2 - 4}}$

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7. integrate the following $\int \frac{\cos \theta d\theta}{\sin^2 \theta \sqrt{\cos e c^2 \theta - 4}}$

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8. Find $\int \frac{1}{(1 + x) \sqrt{1 + 2x - x^2}} dx$

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9. Evaluate $\int \sqrt{\frac{1 + \cos x}{1 - \cos x}} dx$

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10. Find $\int \frac{1}{3x^2 + 2x + 1} dx$

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11. Evaluate $\int \frac{\sin^{-1} x}{\sqrt{1 - x^2}} dx$

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12. Find $\int \frac{x^3 - 1}{x^3 + x} dx$

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13. Evaluate the following integrals :

$$\int \left[\log(\log x) + \frac{1}{(\log x)^2} \right] dx.$$

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14. Evaluate $\int \frac{x^3 - 7x + 6}{x^2 + 3x} dx$

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15. Find $\int x e^{x^2} dx$

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Topic 2 Practise Questions 1 Mark Questions

1. If f is an odd function, then write the value of

$$\int_{-a}^a \frac{f(\sin x)}{f(\cos x) + f(\sin^2 x)} dx$$



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2. Write the definite integral which is equal to $\lim_{n \rightarrow \infty} \frac{1}{n} \sum_{r=1}^n \frac{r}{\sqrt{n^2 + r^2}}$



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3. Write the value of $\int_0^1 [x] dx$, where $[x]$ stands for fractional part of x .



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4. Write the value of $\int_0^{\pi/2} (\sin x) dx - \int_0^{-\pi/2} (\cos x) dx$



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5. If $\int_2^3 f(z)dx = 9$, then write the value of $\int_2^3 f(\phi(z))d(\phi(z))$.

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6. Write the value of $\int_{-\pi/4}^{\pi/4} \sin^5 x \cos x dx$

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7. Evaluate $\int_0^4 \sqrt{x} dx$

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8. What is the value of $\int_{-1}^1 \frac{dx}{1+x^2} dx$

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9. If $\int_1^2 f(x)dx = \lambda$ then what is the value of

$$\int_1^2 f(3-x)dx$$

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10. Evaluate $\int_0^7 \left[\frac{x}{3} \right] dx$

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11. If f is an even function and $\int_{-2}^0 f(t)dt = \frac{3}{2}$, then find $\int_{-2}^2 f(x)dx$.

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12. Evaluate $\int_{-\pi/4}^{\pi/4} (x^3 + \sin x) dx$

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13. If $\int_0^a [\sin x + \cos(a - x)] dx = p$ then write the value of $\int_0^a [\sin(a - x) + \cos x] dx$

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14. Evaluate $\int_0^2 3 - 2x dx$

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15. Evaluate $\int_0^1 [3x] dx$

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16. Evaluate $\int_{-1}^1 (|x| + x)^2 dx$

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17. Write the value of $\int_{\frac{\pi}{3}}^{\frac{\pi}{3}} (x^4 \sin x^3 + x \cos^2 x) dx$

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

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19. Evaluate $\int_{-\pi/2}^{\pi/2} \sin^5 x \cos x dx$

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20. What is the value of $\int_1^3 \tan^{-1} x dx + \int_1^3 \cot^{-1} x dx$

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21. If $\int_0^1 f(t)dt = 2$ and $\int_1^2 f(u)du = -1$, then what is the value of $\int_0^2 f(x)dx$

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22. Evaluate $\int_{-\pi/6}^{\pi/6} \sin^3 x dx$

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23. Evaluate $\int_1^4 [x]dx$

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24. $\int_{\frac{2}{\sqrt{3}}}^2 \frac{dx}{x(\sqrt{x^2 - 1})}$

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25. Evaluate $\int_0^{\pi} \sin^3 x \cos x dx$

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26. Evaluate $\int_0^{\pi} \cos^3 x dx$

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Topic 2 Practise Questions 4 Mark Questions

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

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2. $\int_0^a x^3 (a^2 - x^2)^{\frac{5}{2}} dx$

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3. Evaluate $\int_{-1}^2 \{|x| + [x]\} dx$

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4. Evaluate $\int_0^1 x^7 \sqrt{\left(\frac{1+x^2}{1-x^2}\right)} dx, 0 \leq x \leq 1$

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5. $\int_0^2 [x^2] dx$

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

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7. Evaluate $\int_{-3/5}^{3/5} [2x] dx$

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8. Evaluate $\int_0^8 |x - 5| dx$

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

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10. Evaluate : $\int_0^{\pi/4} \frac{dx}{\cos x} (\cos x + \sin x)$.

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11. Evaluate: $\int_0^4 |8 - 3x| dx$

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12. Evaluate $\int_0^1 (1 + x^2) dx$

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13. Evaluate $\int_0^\pi \sin x dx$

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

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15. Evaluate $\int_0^3 x^2 \cdot e^{x^3} dx$

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

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17. Evaluate $\int_0^7 \frac{dx}{\sqrt{x+2} + \sqrt{x+7}}$

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18. Evaluate $\int_0^{\pi/2} \frac{\cos x}{(2 + \sin x)(3 + \sin x)} dx$

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19. Evaluate $\int_1^0 \frac{\tan^{-1} x}{1+x^2} dx$

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20. Evaluate $\int x \log(1+x) dx$

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21. Evaluate $\int_1^2 \frac{dx}{16-x^2}$

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22. Evaluate $\int_0^{\pi/2} \cos x dx$

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

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24. Evaluate $\int_0^{100} (x - [x]) dx$

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

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26. Show that

$$\int_0^{\frac{\pi}{2}} \frac{\cos x - \sin x}{1 + \sin x \cos x} dx = 0$$

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27. If $f(2-p) = f(p)$, $\int_0^2 f(x)dx = 6$ and $\int_{1/2}^4 f(2u)du = 7$ then evaluate $\int_0^8 f(x)dx$

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28. Evaluate $\int_1^2 x dx$

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Topic 2 Practise Questions 6 Mark Questions

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

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2. Evaluate $\int_0^1 \frac{\log_e(1+x)}{1+x^2} dx$

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3. Prove that $\int_0^{\pi/4} \cos^2 2x \sin^3 4x dx = \frac{1}{6}$

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4. Evaluate $\int_0^{\pi/2} \frac{\sin x(7 - \cos x)}{(1 + \cos^2 x)(2 - \cos x)} dx$

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5. Evaluate $\int_0^{\pi/2} \frac{(1 - \sin^2 x)(4 \sin x - 3)}{(4 - \cos^2 x)(\sin x + 4)} dx$

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

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7. Find $\int_1^2 x \, dx$ as a limit of sum.

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8. Evaluate $\int_0^{-\pi/2} \sin x \, dx$

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

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10. Evaluate $\int_{\pi/2}^{\pi} e^x \left(\frac{1 - \sin x}{1 - \cos x} \right) \, dx$

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1. Evaluate $\int_0^2 \sqrt{4-x^2} dx$

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2. Find $\int_{-\pi/4}^{\pi/4} \sin^3 x dx$

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

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

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5. $\int_0^{\frac{3}{2}} [2x] dx$

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6. $\int_0^a x^3 (a^2 - x^2)^{\frac{5}{2}} dx$

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7. Evaluate $\int_0^{-\pi/2} (4 + 5 \sin x) dx$

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8. Find $\int_0^{\pi/2} \cos^{12} x dx$

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9. $\int_0^{\frac{\pi}{4}} x \sin x dx$

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10. $\int_{-2}^1 (|x| + x) dx$

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11. Find the value of the integral

$$\int_{-4}^4 (ax^3 + bx + c) dx$$

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12. Find $\int_{-2}^2 |1 - x^2| dx$

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13. Evaluate $\int_{-1/2}^{1/2} \left[\left(\frac{x+1}{x-1} \right)^2 + \left(\frac{x-1}{x+1} \right)^2 - 2 \right]^{1/2} dx$

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14. Find the value of $\int_{-\pi}^{\pi} 2 \sin x dx$

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15. Find $\int_0^3 \frac{3x+1}{9x^2-1} dx$

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16. Find the value of $\int_0^{\pi/2} |\sin(x - \pi/4)| dx$

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17. Evaluate $\int_0^1 \cot(1+x) dx$



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18. Evaluate $\int_0^1 e^x dx$



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19. $I = \int_0^4 (x^2 + 2x + 4) dx$



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Chapter Test 1 Mark Questions

1. If $\int x^3 e^{cx^4} dx = \frac{1}{20} e^{cx^4}$ then $C = \underline{\hspace{2cm}}$



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2. Evaluate $\int (\cos ecx - \cot x) dx$



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3. Evaluate $\int_2^4 f(x)dx - \int_2^4 f(6-x)dx$



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4. Find $\int_0^{\frac{\pi}{2}} \sin x e^{\cos x} dx$



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5. Evaluate $\int_{\pi/6}^{\pi/3} \cot^{-1}(5/2)x dx + \int_{\pi/6}^{\pi/3} \tan^{-1}(5/2)x dx$



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6. If $f(x)$ is an odd function and $\int_0^1 f(x)dx = 10$ then evaluate $\int_{-1}^0 f(x)dx$



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7. Find $\int \frac{dx}{50 + 2x^2}$

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8. Evaluate $\int_0^2 \sqrt{4 - x^2} dx$

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9. Find the value of $\int_0^{2a} \frac{dx}{2a - x^2}$

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10. Evaluate $\int (e^x(x + 1)) dx$

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Chapter Test 4 Mark Questions

1. $\int \frac{dx}{(e^x - 1)^2}$



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2. Evaluate $\int \sin x \cos^4 x dx$



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3. Evaluate $\int (x^2 + 3x - 1) dx$



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4. $\int_0^1 x(1-x)^n dx$



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5. Evaluate $\int_2^8 (x^2 - 5) dx$

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6. Evaluate $\int (\sin x \cos x) dx$

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

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8. Find $\int_{-\pi/2}^{\pi/2} (1 + \sin \theta) d\theta$

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9. Find $\int_{-\pi/4}^{\pi/4} (\sin x - 4x) dx$

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Chapter Test 6 Mark Questions

1. Find $\int \left(\frac{\sqrt{1+x^2} \{ \log(x^2+1) - 2 \log x \}}{x^4} \right) dx$

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

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

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

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5. Evaluate $\int \sqrt{x^2 - 1} dx$

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6. Evaluate $\int (2x - 3) dx$

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7. Evaluate $\int_1^3 5x^2 dx$

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