



MATHS

BOOKS - RS AGGARWAL MATHS (HINGLISH)

DEFINITE INTEGRALS

Solved Examples

1. Evaluate : (i) $\int_2^4 \frac{dx}{x}$ (ii) $\int_4^9 \sqrt{x} dx$
(iii) $\int_0^1 \frac{dx}{\sqrt{5x+3}}$ (iv) $\int_0^\pi \sin 5x dx$

$$(v) \int_0^{\pi/4} \sin 2x \sin 3x \, dx$$



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

(ii) $\int_0^{\pi/2} \sqrt{1 + \cos 2x} \, dx$



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



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



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5. $\int_0^a \frac{dx}{\sqrt{ax - x^2}}$



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6. Evaluate :

(i) $\int_0^{\pi/2} x \cos x dx$ (ii) $\int_0^{\pi} \cos 2x \log \sin x dx$

$$(iii) \int_1^2 \frac{\log x}{x^2} dx$$

$$(iv) \int_0^{\pi/6} (2 + 3x^2) \cos 3x dx$$



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7. Evaluate: $\int_1^2 \frac{1}{(x+1)(x+2)} dx$

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



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8. Evaluate the following definite integral:

$$\int_1^4 \frac{x^2 + x}{\sqrt{2x + 1}} dx$$



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9. Evaluate :

$$(i) \int_0^{1/2} \frac{dx}{\sqrt{1-x}}$$

$$(ii) \int_0^1 \left(\frac{1-x}{1+x} \right) dx$$



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10. Evaluate : (i) $\int_0^2 e^{x/2} dx$
(ii) $\int_2^4 \frac{x}{(x^2 + 1)} dx$ (iii) $\int_0^1 \cos^{-1} x dx$

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11. Evaluate : (i) $\int_1^3 \frac{\cos(\log x)}{x} dx$
(ii) $\int_0^{\pi/2} \sqrt{\cos \theta} \sin^3 \theta d\theta$
(iii) $\int_0^{\pi/2} \frac{\cos x}{(1 + \sin x)(2 + \sin x)} dx$

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12. Evaluate: $\int_0^1 \frac{x \tan^{-1} x}{(1+x^2)^{3/2}} dx$



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13. Evaluate : (i) $\int_0^{\pi/2} \frac{\cos x}{\left(\cos \frac{x}{2} + \sin \frac{x}{2}\right)} dx$

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



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14. $\int_{-a}^a \sqrt{\frac{a-x}{a+x}} dx$



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15. Evaluate: $\int_0^1 x \sqrt{\frac{1-x^2}{1+x^2}} dx$



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



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17. Evaluate the following integral:

$$\int_0^{\pi/4} (\sqrt{\tan x} + \sqrt{\cot x}) dx$$



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



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19. $\int_0^{\pi/2} \frac{\sqrt{\cos x}}{(\sqrt{\cos x} + \sqrt{\sin x})} dx = ?$



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20. Evaluate : (i) $\int_0^1 x(1-x)^n dx$
(ii) $\int_0^1 x(1-x)^{3/2} dx$



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21. Prove: $\int_0^{\pi/2} \log|\tan x| dx = 0$



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



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23. Show that

$$\int_0^{\frac{\pi}{2}} \log(\sin 2x) dx = -\frac{\pi}{2} (\log 2).$$



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24. Prove that

(a) $\int_0^{\pi/2} \sin 2x \log(\tan x) dx = 0$

$$(b) \int_0^1 \log\left(\frac{1}{x} - 1\right) dx = 0$$



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25.

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



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26.

Prove

that

$$\int_0^{\pi} \frac{x \tan x}{(\sec x + \tan x)} dx = \pi \left(\frac{\pi}{2} - 1 \right).$$



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



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



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



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30. Prove that

$$\int_0^{\pi/2} (2 \log \sin x - \log \sin 2x) dx = \frac{\pi}{2} (\log 2)$$

.



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



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



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33. $\int_0^1 \cot^{-1}(1 - x + x^2) dx$



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34. Evaluate $\int_{\pi/5}^{3\pi/10} \frac{\sin x}{(\sin x + \cos x)} dx.$



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35. Show that $\int_{-\pi/2}^{\pi/2} \sin^7 x dx = 0$.

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36. Examples: $\int_{-\frac{\pi}{2}}^{\frac{\pi}{2}} \sin^2 x dx$

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37. Prove that $\int_{-1}^1 \log\left(\frac{2-x}{2+x}\right)^{20} dx = 0$

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38. Evaluate $\int_1^4 f(x) dx$, where

$$f(x) = \begin{cases} 4x + 3 & \text{if } 1 \leq x \leq 2 \\ 3x + 5 & \text{if } 2 \leq x \leq 4. \end{cases}$$



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39. Evaluate: $\int_0^1 |5x - 3| dx$ (ii) $\int_0^\pi |\cos x| dx$

(iii) $\int_{-5}^5 |x - 2| dx$ (iv) $\int_{-1}^1 e^{|x|} dx$ (v)

$\int_0^2 |x^2 + 2x - 3| dx$ (v)

$\int_1^4 (|x - 1| + |x - 2| + |x - 3|) dx$ (vi)

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



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40. Evaluate $\int_1^4 f(x) dx$, where
 $f(x) = |x - 1| + |x - 2| + |x - 3|$.



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41. Evaluate :

(i) $\int_{-\pi/2}^{\pi/2} |\sin x| dx$

(ii) $\int_{-1}^1 e^{|x|} dx$

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



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$$42. \int_0^{2\pi} |\sin x| dx = ?$$



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$$43. \int_{-\frac{\pi}{2}}^{\frac{\pi}{2}} [\sin|x| + \cos|x|] dx \quad (\text{ii}) \int \sin|x| + \cos|x| dx$$



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44. Evaluate the following integrals:

$$(i) \int_0^5 (x + 1) dx \quad (ii) \int_1^3 (2x + 3) dx$$



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45. Evaluate the following integrals:

$$(i) \int_0^2 (x^2 + 1) dx \quad (ii) \int_1^3 (x^2 + x) dx$$



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46. Evaluate $\int_0^1 (3x^2 + 2x + 1) dx$ as limit of the sum.



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47. Evaluate the following definite integrals as limit of sums. $\int -11e^x dx$



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48. Integrate from the first principles

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



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Exercise 16 A

1. $\int_1^3 x^4 dx$



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$$2. \int_1^4 \sqrt{x} dx$$



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$$3. \int_1^2 x^{-5} dx$$



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$$4. \int_0^{16} x^{3/4} dx$$



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5. $\int_{-4}^{-1} \frac{dx}{x}$



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6. $\int_1^4 \frac{dx}{\sqrt{x}}$



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7. $\int_0^1 \frac{dx}{3\sqrt{x}}$



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8. $\int_1^8 \frac{dx}{x^{2/3}}$



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9. $\int_2^4 3dx$



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



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



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



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13. $\int_0^{\pi/6} \sec^2 x dx$



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14. $\int_{-\pi/4}^{\pi/4} \cos ec^2 x dx$



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15. Evaluate : $\int_{\frac{\pi}{4}}^{\pi/2} \cot x dx$



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16. $\int_0^{\frac{\pi}{4}} \tan^2 x dx$



Watch Video Solution

$$17. \int_0^{\pi/2} \sin^2 x dx = ?$$



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$$18. \int_0^{\pi/4} \cos^2 x dx$$



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$$19. \int_0^{\pi/3} \tan x dx$$



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20. Evaluate the definite integrals

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



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21. $\int_0^{\pi} \cos^3 x dx =$



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$$22. \int_0^{\frac{\pi}{2}} \sin^3 x dx$$



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$$23. \int_{\pi/4}^{\pi/2} \frac{(1 - 3 \cos x)}{\sin^2 x} dx$$



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$$24. \int_0^{\pi/4} \sqrt{1 + \cos 2x} dx$$



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

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

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26. $\int_{-\pi/4}^{\pi/4} \frac{dx}{(1 + \sin x)}$

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27. $\int_0^{\pi/4} \frac{dx}{(1 + \cos 2x)}$



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$$28. \int_{\pi/4}^{\pi/2} \frac{dx}{(1 - \cos 2x)}$$



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$$29. \int_0^{\pi/4} \sin 2x \sin 3x dx$$



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$$30. \int_0^{\frac{\pi}{6}} \cos x \cdot \cos 2x dx =$$



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$$31. \int_0^{\pi} (\sin 2x \cos 3x) dx = ?$$



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$$32. \int_0^{\pi/2} \sqrt{1 + \sin x} dx$$



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33. $\int_0^{\pi/2} \sqrt{1 + \cos x} dx$



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34. $\int_0^2 \frac{(x^4 + 1)}{(x^2 + 1)} dx$



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35. Evaluate: $\int_1^2 \frac{1}{(x + 1)(x + 2)} dx$ (ii)

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





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36. Evaluate : $\int_1^2 \frac{x + 3}{x(x + 2)} dx$



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37. $\int_3^4 \frac{dx}{(x^2 - 4)}$



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38. Evaluate : (i) $\int_0^4 \frac{dx}{\sqrt{x^2 + 2x + 3}}$

(ii) $\frac{dx}{(1 + x + x^2)}$



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39. $\int_1^2 \frac{dx}{\sqrt{x^2 + 4x + 3}}$



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40. Evaluate the following definite integral:

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



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41. $\int_0^{\pi/2} (a \cos^2 x + b \sin^2 x) dx$



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42. $\int_{\pi/3}^{\pi/4} (\tan x + \cot x)^2 dx$



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$$43. \int_0^{\pi/2} \cos^4 x dx$$



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$$44. \int_0^a \frac{dx}{(ax + a^2 - x^2)}$$



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$$45. \text{ Evaluate: } \int_{1/4}^{1/2} \frac{1}{\sqrt{x - x^2}} dx$$



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46. Evaluate : $\int_0^1 \sqrt{x(1-x)} dx$



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47. $\int_1^3 \frac{dx}{x^2(x+1)}$



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



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49. Evaluate: $\int_0^1 x e^x dx$



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



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51. $\int_0^{\pi/4} x^2 \sin x dx$



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52. Evaluate the following definite integral:

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



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53. $\int_0^{\pi/2} x^3 \sin 3x dx$



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54. Evaluate the following definite integral:

$$\int_0^{\pi/2} x^2 \cos^2 x \, dx$$



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55. $\int_1^2 \log x \, dx$



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$$56. \int_1^3 \frac{\log x}{(1+x)^2} dx$$



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$$57. \int_0^{e^2} \left\{ \frac{1}{(\log x)} - \frac{1}{(\log x)^2} \right\} dx$$



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$$58. \int_1^e e^x \left(\frac{1+x \log x}{x} \right) dx$$



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$$59. \int_0^1 \frac{x e^x}{(1+x)^2} dx = ?$$



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$$60. \int_0^{\pi/4} 2 \tan^3 x dx$$



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$$61. \int_1^2 \frac{5x^2}{x^2 + 4x + 3} dx$$



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Exercise 16 B

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



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



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3. $\int_1^2 \frac{3x}{9x^2 - 1} dx$



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



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5. $\int_0^1 \frac{e^x}{(1 + e^{2x})} dx$



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$$6. \int_0^1 \frac{2x}{(1+x^4)} dx$$



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$$7. \int_0^1 x e^{x^2} dx$$



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$$8. \int_1^2 \frac{e^{1/x}}{x^2} dx$$



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9.
$$\int_0^{\pi/6} \frac{\cos x}{(3 + 4 \sin x)} dx$$



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10.
$$\int_0^{\pi/2} \frac{\sin x}{(1 + \cos^2 x)} dx$$



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11.
$$\int_0^1 \frac{dx}{e^x + e^{-x}}$$



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$$12. \int_{1/e}^e \frac{dx}{x(\log x)^{1/3}}$$



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$$13. \int_0^1 \frac{\sqrt{\tan^{-1} x}}{(1+x^2)} dx$$



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$$14. \int_0^{\pi/2} \frac{\sin x}{\sqrt{1+\cos x}} dx$$



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$$15. \int_0^{\frac{\pi}{2}} \sqrt{\sin x} \cos^5 x \, dx$$



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$$16. \int_0^{\pi/2} \frac{\sin x \cos x}{(1 + \sin^4 x)} \, dx$$



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$$17. \int_0^a \sqrt{a^2 - x^2} \, dx =$$





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18. $\int_0^{\sqrt{2}} \sqrt{2 - x^2} dx = ?$



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19. Evaluate: $\int_0^a \frac{x^4}{\sqrt{a^2 - x^2}} dx$



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20. $\int_0^a \frac{x}{\sqrt{a^2 + x^2}} dx$



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$$21. \int_0^2 x \sqrt{2+x} dx$$



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$$22. \int_0^1 \sin^{-1} \left(\frac{2x}{1+x^2} \right) dx$$



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23. $\int_0^{\pi/2} \sqrt{1 + \cos x} dx$



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24. $\int_0^{\pi/2} \sqrt{1 + \sin x} dx$



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25. Prove that

$$\int_0^{\frac{\pi}{2}} \frac{dx}{a^2 \cos^2 x + b^2 \sin^2 x} = \frac{\pi}{2ab} (a, b > 0)$$



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$$26. \int_0^{\pi/2} \frac{dx}{(1 + \cos^2 x)}$$



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$$27. \int_0^{\pi/2} \frac{dx}{(4 + 9 \cos^2 x)}$$



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$$28. \int_0^{\frac{\pi}{2}} \frac{dx}{5 + 4 \sin x}$$



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$$29. \int_0^{\pi} \frac{dx}{(6 - \cos x)}$$



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$$30. \int_0^{\pi} \frac{dx}{(5 + 4 \cos x)}$$



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$$31. \int_0^{\pi/2} \frac{dx}{(\cos x + 2 \sin x)}$$



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



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$$33. \int_0^{\pi/4} \frac{\tan^3 x}{(1 + \cos 2x)} dx$$



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$$34. \int \frac{\sin 2x}{\cos^2 x + 3 \cos x + 2} dx$$



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



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$$36. \int_{\pi/3}^{\pi/2} \frac{\sqrt{1 + \cos x}}{(1 - \cos x)^{5/2}} dx$$



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37. $\int_0^1 (\cos^{-1} x)^2 dx$



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38. Evaluate: $\int_0^1 x (\tan^{-1} x)^2 dx$



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39. $\int_0^1 \sin^{-1} \sqrt{x} dx$



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$$40. \int_0^{\frac{\pi}{4}} \sin^{-1} \sqrt{\frac{x}{a+x}} dx$$



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$$41. \int_0^9 \frac{dx}{1 + \sqrt{x}}$$



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$$42. \int_0^1 x^3 \sqrt{1 + 3x^4} dx$$



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$$43. \int_0^1 \frac{(1 - x^2)}{(1 + x^2)^2} dx$$



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$$44. \int_1^2 \frac{dx}{(x + 1)\sqrt{x^2 - 1}}$$



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$$45. \int_0^{\pi/2} (\sqrt{\tan x} + \sqrt{\cot x}) dx$$



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$$46. \int_2^3 \frac{2-x}{\sqrt{5x-6-x^2}}$$



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$$47. \int_{\pi/4}^{\pi/2} \frac{\cos \theta}{\left(\cos \frac{\theta}{2} + \sin \frac{\theta}{2}\right)} d\theta$$



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$$48. \int_0^{(\pi/2)^{1/3}} x^2 \sin x^3 dx$$



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$$49. \int_1^2 \frac{dx}{x(1 + \log x)^2}$$



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$$50. \int_{\pi/6}^{\pi/2} \frac{\cos ecx \cot x}{1 + \cos ec^2 x} dx$$



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



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$$2. \int_0^{\pi/2} \frac{\sqrt{\sin x}}{(\sqrt{\sin x} + \sqrt{\cos x})} dx = \frac{\pi}{4}$$



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



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

$$(ii) \int_0^{\pi/2} \frac{\sin^5 x dx}{(\sin^5 x + \cos^5 x)} dx = \frac{\pi}{4}$$



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



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$$6. \int_0^{\pi/2} \frac{\cos^{1/4} x}{\left(\sin^{1/4} x + \cos^{1/4} x\right)} dx = ?$$

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$$7. \int_0^{\pi/2} \frac{\sin^{3/2} x}{\left(\sin^{3/2} x + \cos^{3/2} x\right)} dx = \frac{\pi}{4}$$

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$$8. \int_0^{\pi/2} \frac{\sin^n x}{\left(\sin^n x + \cos^n x\right)} dx = ?$$

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9. The value of the integral

$$\int_0^{\pi/2} \frac{\sqrt{\cot x}}{\sqrt{\cot x} + \sqrt{\tan x}} dx \text{ is}$$



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10. The value of the integral

$$\int_0^{\pi/2} \frac{\sqrt{\cot x}}{\sqrt{\cot x} + \sqrt{\tan x}} dx \text{ is}$$



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11. $\int_0^{\pi/2} \frac{1}{(1 + \tan x)} dx = ?$



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12. $\int_0^{\pi/2} \frac{dx}{(1 + \cot x)} = \frac{\pi}{4}$



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13. The value of $\int_0^{\pi/2} \frac{dx}{1 + \tan^3 x}$ (i)0 (ii)1 (iii)
 $\frac{\pi}{2}$ (iv) $\frac{\pi}{4}$



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$$14. \int_0^{\pi/2} \frac{dx}{(1 + \cot^3 x)} = \frac{\pi}{4}$$



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$$15. \int_0^{\pi/2} \frac{dx}{(1 + \sqrt{\tan x})} = \frac{\pi}{4}$$



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$$16. \int_0^{\pi/2} \frac{\sqrt{\cot x}}{(1 + \sqrt{\cot x})} dx = ?$$





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$$17. \int_0^{\pi/2} \frac{dx}{(1 + \sqrt{\tan x})} = \frac{\pi}{4}$$



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$$18. \int_0^{\pi/2} \frac{(\sin x - \cos x)}{(1 + \sin x \cos x)} dx = 0$$



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$$19. \text{Evaluate : } \int_0^1 x(1-x)^5 dx$$



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$$20. \int_0^2 x \sqrt{2-x} dx$$



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$$21. \int_0^{\pi} x \sin^2 x dx = \frac{\pi^2}{4}$$



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$$22. \int_0^{\pi} \frac{x \tan x}{(\sec x \cos ecx)} dx = \frac{\pi^2}{4}$$



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23.

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



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24.
$$\int_0^{\pi} \frac{x \tan x}{(\sec x + \cos x)} dx = \frac{\pi^2}{4}$$



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$$25. \int_0^{\pi} \frac{x \sin x}{(1 + \sin x)} dx = \pi \left(\frac{\pi}{2} - 1 \right)$$



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26. सिद्ध कीजिए की

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



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27.

$$\int_0^{\pi/2} (2 \log \cos x - \log \sin 2x) dx = -\frac{\pi}{2} \log 2$$



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$$28. \int_0^{\infty} \frac{x}{(1+x)(1+x^2)} dx$$



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$$29. \int_0^a \frac{dx}{x + \sqrt{a^2 - x^2}} = \frac{\pi}{4}$$



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$$30. \int_0^a \frac{\sqrt{x}}{(\sqrt{x} + \sqrt{a-x})} dx = \frac{a}{2}$$



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$$31. \int_0^{\pi} \sin^2 x \cos^3 x dx = 0$$



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$$32. \int_0^{\pi} \sin^{2m} x \cos^{2m+1} x dx = 0$$



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33.

$$\int_0^{\pi/2} (\sin x - \cos x) \log(\sin x + \cos x) dx = 0$$



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34.

Show

that

$$\int_0^{\frac{\pi}{2}} \log(\sin 2x) dx = -\frac{\pi}{2} (\log 2).$$



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35. $\int_0^{\pi} x \log \sin x dx$



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$$36. \int_0^{\pi} \log(1 + \cos x) dx = -\pi(\log 2)$$



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$$37. \int_0^{\pi/2} \log(\tan x + \cot x) dx = \pi(\log 2)$$



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$$38. \int_{\pi/8}^{3\pi/8} \frac{\cos x}{(\cos x + \sin x)} dx = \frac{\pi}{8}$$

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$$39. \int_{\pi/6}^{\pi/3} \frac{1}{(1 + \sqrt{\tan x})} dx = \frac{\pi}{12}$$

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$$40. \int_{\pi/4}^{3\pi/4} \frac{dx}{1 + \cos x} \text{ is equal to}$$

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41. If $\int_{\frac{\pi}{4}}^{\frac{3\pi}{4}} \frac{x}{1 + \sin x} dx = k(\sqrt{2} - 1)$, then $k =$

(A) 0 (B) π (C) 2π (D) none of these



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42. $\int_{a/4}^{3a/4} \frac{\sqrt{x}}{\sqrt{a-x} + \sqrt{x}} dx = \frac{a}{4}$



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$$43. \int_1^4 \frac{\sqrt{x} dx}{\sqrt{5-x} + \sqrt{x}}$$



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$$44. \int_0^{\pi/2} x \cot x dx = \frac{\pi}{2} (\log 2)$$



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$$45. \int_0^1 \left(\frac{\sin^{-1} x}{x} \right) dx = \frac{\pi}{2} (\log 2)$$



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$$46. \int_0^1 \frac{\log x}{\sqrt{1-x^2}} dx = -\frac{\pi}{2}(\log 2)$$



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$$47. \int_0^1 \frac{\log|1+x|}{1+x^2} dx = \frac{\pi}{8} \log 2$$



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$$48. \int_{-a}^a x^3 \sqrt{a^2 - x^2} dx = 0$$



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$$49. \int_{-\pi}^{\pi} (\sin^{75} x + x^{125}) dx = 0$$



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$$50. \int_{-\pi}^{\pi} x^{12} \sin^9 x dx = 0$$



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$$51. \int_{-1}^1 e^{|x|} dx = 2(e - 1)$$



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$$52. \int_{-2}^2 |x + 1| dx = 6$$



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$$53. \int_0^8 |x - 5| dx = 17$$



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$$54. \int_0^{2\pi} |\cos x| dx = 4$$



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$$55. \int_{-\pi/4}^{\pi/4} |\sin x| dx = (2 - \sqrt{2})$$

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$$56. \text{ Let } f(x) = \begin{cases} 2x + 1 & \text{when } 1 \leq x \leq 2 \\ x^2 + 1 & \text{when } 2 \leq x \leq 3 \end{cases}.$$

Show that $\int_1^3 f(x) dx = \frac{34}{3}$.

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57. Let $f(x) = \begin{cases} 3x^2 + 4 & \text{when } 0 \leq x \leq 2 \\ 9x - 2 & \text{when } 2 \leq x \leq 4 \end{cases}$.

Show that $\int_0^4 f(x) dx = 66$.



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58.

Prove

that

$$\int_0^4 \{|x| + |x - 2| + |x - 4|\} dx = 20.$$



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



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



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3. $\int_1^3 x^2 dx$



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



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$$5. \int_2^5 (3x^2 - 5) dx$$



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$$6. \int_0^3 (x^2 + 2x) dx$$



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$$7. \int_1^4 (3x^2 + 2x) dx$$



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$$8. \int_1^3 (x^2 + 5x) dx$$



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$$9. \int_1^3 (2x^2 + 5x) dx$$



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10. $\int_0^2 x^3 dx$



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11. $\int_2^4 (x^2 - 3x + 2) dx$



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



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$$13. \int_0^3 (2x^2 + 3x + 5) dx$$



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$$14. \int_0^1 |3x - 1| dx =$$



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$$15. \int_0^2 e^x dx$$



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16. $\int_1^3 e^{-x} dx$



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17. $\int_a^b \cos x dx$



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Objective Questions

1. $\int_1^4 x\sqrt{x} dx = ?$

A. 12.8

B. 12.4

C. 7

D. none of these

Answer: B



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2. $\int_0^2 \sqrt{6x + 4} dx$

A. $\frac{64}{9}$

B. 7

C. $\frac{56}{9}$

D. $\frac{60}{9}$

Answer: C



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3. $\int_0^1 \frac{dx}{\sqrt{5x+3}} = ?$

A. $\frac{2}{5}(\sqrt{8} - \sqrt{3})$

B. $\frac{2}{5}(\sqrt{8} + \sqrt{3})$

C. $\frac{2}{5}\sqrt{8}$

D. none of these

Answer:



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

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

B. $\frac{\pi}{3}$

C. $\frac{\pi}{4}$

D. none of these

Answer: C



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5. $\int_0^2 \frac{dx}{\sqrt{4-x^2}} = ?$

A. 1

B. $\sin^{-1} \frac{1}{2}$

C. $\frac{\pi}{4}$

D. none of these

Answer:



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6. $\int_{\sqrt{3}}^{\sqrt{8}} x \sqrt{1+x^2} dx = ?$

A. $\frac{19}{3}$

B. $\frac{19}{6}$

C. $\frac{38}{3}$

D. $\frac{9}{4}$

Answer: A



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7. The value of the integral $\int_0^1 \frac{x^3}{1+x^8} dx$ is

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

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

C. $\frac{\pi}{8}$

D. $\frac{\pi}{16}$

Answer: D



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8. $\int_1^e \frac{(\log x)^2}{x} dx = ?$

A. $\frac{1}{3}$

B. $\frac{1}{3}e^2$

C. $\frac{1}{3}(e^3 - 1)$

D. none of these

Answer: A



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9. $\int_{\pi/4}^{\pi/2} \cot x dx = ?$

A. $\log 2$

B. $2 \log 2$

C. $\frac{1}{2} \log 2$

D. none of these

Answer:



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10. Evaluate: $\int_0^{\pi/4} \tan^2 x dx$

A. $\left(1 - \frac{\pi}{4}\right)$

B. $\left(1 + \frac{\pi}{4}\right)$

C. $\left(1 - \frac{\pi}{2}\right)$

D. $\left(1 + \frac{\pi}{2}\right)$

Answer:



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11. Evaluate the definite integrals

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

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

B. π

C. $\frac{\pi}{4}$

D. 1

Answer: C



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12. $\int_{\pi/3}^{\pi/2} \cos ecx dx = ?$

A. $\frac{1}{2} \log 2$

B. $\frac{1}{2}\log 3$

C. $-\log 2$

D. none of these

Answer:



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

A. 1

B. $\frac{3}{4}$

C. $\frac{2}{3}$

D. none of these

Answer: C



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14. $\int_0^{\pi/4} \frac{e^{\tan x}}{\cos^2 x} dx = ?$

A. $(e - 1)$

B. $(e + 1)$

C. $\left(\frac{1}{e} + 1\right)$

D. $\left(\frac{1}{e} - 1\right)$

Answer: A



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15. $\int_0^{\pi/2} \frac{\cos x}{(1 + \sin^2 x)} dx = ?$

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

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

C. π

D. none of these

Answer: B



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16. $\int_{1/\pi}^{2/\pi} \frac{\sin(1/x)}{x^2} dx = ?$

A. 1

B. $\frac{1}{2}$

C. $\frac{3}{2}$

D. none of these

Answer: A



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17. $\int_0^{\pi} \frac{dx}{(1 + \sin x)} = ?$

A. $\frac{1}{2}$

B. 1

C. 2

D. 0

Answer:



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18. $\int_0^{\pi/2} (\sqrt{\sin x} \cos x)^3 dx = ?$

A. $\frac{2}{9}$

B. $\frac{2}{15}$

C. $\frac{8}{45}$

D. $\frac{5}{2}$

Answer: C



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19. $\int_0^1 \frac{xe^x}{(1+x)^2} dx = ?$

A. $\left(\frac{e}{2} - 1\right)$

B. $(e - 1)$

C. $e(e - 1)$

D. none of these

Answer: A



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20. $\int_0^{\pi/2} e^x \left(\frac{1 + \sin x}{1 + \cos x} \right) dx = ?$

A. 0

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

C. $e^{\pi/2}$

D. $(e^{\pi/2} - 1)$

Answer:



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21. $\int_0^{\frac{\pi}{4}} \sqrt{1 + \sin 2x} dx$

A. 0

B. 1

C. 2

D. $\sqrt{2}$

Answer: B



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22. $\int_0^{\pi/2} \sqrt{1 + \cos 2x} dx = ?$

A. $\sqrt{2}$

B. $\frac{3}{2}$

C. $\sqrt{3}$

D. 2

Answer:



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

A. $\frac{1}{2} \log 2$

B. $(2 \log 2 + 1)$

C. $(2 \log 2 - 1)$

D. $\left(\frac{1}{2} \log 2 - 1\right)$

Answer:



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24. $\int_0^{\pi/2} \sin^2 x dx = ?$

A. $\frac{\pi}{3}$

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

C. $\frac{\pi}{2}$

D. $\frac{2\pi}{3}$

Answer:



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25. $\int_0^{\pi/6} \cos x \cos 2x dx$

A. $\frac{1}{4}$

B. $\frac{5}{12}$

C. $\frac{1}{3}$

D. $\frac{7}{12}$

Answer:



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26. $\int_0^{\pi/2} \sin x \sin 2x dx = ?$

A. $\frac{2}{3}$

B. $\frac{3}{4}$

C. $\frac{5}{6}$

D. $\frac{3}{5}$

Answer:



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27. $\int_0^{\pi} (\sin 2x \cos 3x) dx = ?$

A. $\frac{4}{5}$

B. $-\frac{4}{5}$

C. $\frac{5}{12}$

D. $-\frac{12}{5}$

Answer:



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

A. $\left(1 - \frac{\pi}{4}\right)$

B. $\tan^{-1} e$

C. $\tan^{-1} e + \frac{\pi}{4}$

D. $\tan^{-1} e - \frac{\pi}{4}$

Answer: D



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29. $\int_0^9 \frac{dx}{1 + \sqrt{x}}$

A. $(3 - 2 \log 2)$

B. $(3 + 2 \log 2)$

C. $(6 - 2 \log 4)$

D. $(6 + 2 \log 4)$

Answer:



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30. $\int_0^{\pi/2} x \cos x dx = ?$

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

B. $\left(\frac{\pi}{2} - 1\right)$

C. $\left(\frac{\pi}{2} + 1\right)$

D. none of these

Answer:



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

A. $\frac{\pi}{\sqrt{3}}$

B. $\frac{\pi}{3}$

C. $\frac{\pi}{3\sqrt{3}}$

D. none of these

Answer:



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

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

B. $\left(\frac{\pi}{2} - 1\right)$

C. $\left(\frac{\pi}{2} + 1\right)$

D. none of these

Answer:



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

A. $(\log 2 + 1)$

B. $(\log 2 - 1)$

C. $(2\log 2 - 1)$

D. $(2\log 2 + 1)$

Answer:



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34. Evaluate: $\int_{-a}^a \sqrt{\frac{a-x}{a+x}} dx$

A. $a\pi$

B. $\frac{a\pi}{2}$

C. $2a\pi$

D. none of these

Answer:



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35. $\int_0^{\sqrt{2}} \sqrt{2 - x^2} dx = ?$

A. π

B. 2π

C. $\frac{\pi}{2}$

D. none of these

Answer:



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36. $\int_{-2}^2 |x| dx$ is equal to

A. 4

B. 3.5

C. 2

D. 0

Answer:



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37. Evaluate the following integral:

$$\int_0^1 |2x - 1| dx$$

A. 2

B. $\frac{1}{2}$

C. 1

D. 0

Answer:



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38. $\int_{-2}^1 |2x + 1| dx$

A. $\frac{5}{2}$

B. $\frac{7}{2}$

C. $\frac{9}{2}$

D. 4

Answer:



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39. $\int_{-2}^1 \frac{|x|}{x} dx = ?$

A. 3

B. 2.5

C. 1.5

D. none of these

Answer: D



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40. $\int_{-a}^a x|x|dx = ?$

A. 0

B. $2a$

C. $\frac{2a^3}{3}$

D. none of these

Answer:



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41. $\int_0^{\pi} |\cos x| dx = ?$

A. 2

B. $\frac{3}{2}$

C. 1

D. 0

Answer:



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42. $\int_0^{2\pi} |\sin x| dx = ?$

A. 2

B. 4

C. 1

D. none of these

Answer:



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43.
$$\int_0^{\pi/2} \frac{\sin x}{(\sin x + \cos x)} dx = ?$$

A. π

B. $\frac{\pi}{2}$

C. 0

D. $\frac{\pi}{4}$

Answer:



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44.
$$\int_0^{\pi/2} \frac{\sqrt{\cos x}}{(\sqrt{\cos x} + \sqrt{\sin x})} dx = ?$$

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

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

C. π

D. 0

Answer: B



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

A. $\frac{\pi}{4}$

B. $\frac{\pi}{2}$

C. 1

D. 0

Answer:



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46.
$$\int_0^{\pi/2} \frac{\cos^{1/4} x}{\left(\sin^{1/4} x + \cos^{1/4} x\right)} dx = ?$$

A. 0

B. 1

C. $\frac{\pi}{4}$

D. none of these

Answer:



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47. $\int_0^{\pi/2} \frac{\sin^n x}{(\sin^n x + \cos^n x)} dx = ?$

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

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

C. 1

D. 0

Answer:



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48. The value of the integral

$$\int_0^{\pi/2} \frac{\sqrt{\cot x}}{\sqrt{\cot x} + \sqrt{\tan x}} dx \text{ is}$$

A. 0

B. $\frac{\pi}{2}$

C. $\frac{\pi}{4}$

D. none of these

Answer: C



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49. $\int_0^{\pi/2} \frac{\sqrt[3]{\tan x}}{(\sqrt[3]{\tan x} + \sqrt[3]{\cot x})} dx = ?$

A. 0

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

C. $\frac{\pi}{2}$

D. π

Answer:



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50. $\int_0^{\pi/2} \frac{1}{(1 + \tan x)} dx = ?$

A. 0

B. $\frac{\pi}{2}$

C. $\frac{\pi}{4}$

D. π

Answer:



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51. $\int_0^{\pi/2} \frac{1}{(1 + \sqrt{\cot x})} dx = ?$

A. 0

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

C. $\frac{\pi}{2}$

D. π

Answer:



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52. The value of $\int_0^{\pi/2} \frac{dx}{1 + \tan^3 x}$ (i)0 (ii)1 (iii)
 $\frac{\pi}{2}$ (iv) $\frac{\pi}{4}$

A. $\frac{\pi}{4}$

B. 0

C. $\frac{\pi}{2}$

D. none of these

Answer:



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53. $\int_0^{\pi/2} \frac{\sec^5 x}{(\sec^5 x + \cos ec^5 x)} dx = ?$

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

B. 0

C. $\frac{\pi}{4}$

D. π

Answer:



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54. $\int_0^{\pi/2} \frac{\sqrt{\cot x}}{(1 + \sqrt{\cot x})} dx = ?$

A. $\frac{\pi}{4}$

B. $\frac{\pi}{2}$

C. 0

D. 1

Answer:



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55. $\int_0^{\pi/2} \frac{\tan x}{(1 + \tan x)} dx = ?$

A. 0

B. 1

C. $\frac{\pi}{4}$

D. π

Answer:



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56. $\int_{-\pi}^{\pi} x^4 \sin x dx = ?$

A. 2π

B. π

C. 0

D. none of these

Answer: C



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57. $\int_{-\pi}^{\pi} x^3 \cos^3 x dx = ?$

A. π

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

C. 2π

D. 0

Answer:



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58. $\int_{-\pi}^{\pi} \sin^5 x dx = ?$

A. $\frac{3\pi}{4}$

B. 2π

C. $\frac{5\pi}{16}$

D. 0

Answer:



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59. $\int_{-1}^{-2} x^3(1 - x^2) dx = ?$

A. $-\frac{40}{3}$

B. $\frac{40}{3}$

C. $\frac{5}{6}$

D. 0

Answer:



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60. $\int_{-a}^a \log\left(\frac{a-x}{a+x}\right) dx = ?$

A. $2a$

B. a

C. 0

D. 1

Answer:



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61. $\int_{-\pi}^{\pi} (\sin^{61} x + x^{123}) dx = ?$

A. 2π

B. 0

C. $\frac{\pi}{2}$

D. 125π

Answer:



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62. $\int_{-\pi}^{\pi} \tan x dx = ?$

A. 2

B. $\frac{1}{2}$

C. -2

D. 0

Answer: D



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63. $\int_{-1}^1 \log(x + \sqrt{x^2 + 1}) dx = ?$

A. $\log \frac{1}{2}$

B. $\log 2$

C. $\frac{1}{2} \log 2$

D. 0

Answer:



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64. $\int_{-\frac{\pi}{2}}^{\frac{\pi}{2}} \cos x dx$

A. 0

B. 2

C. -1

D. none of these

Answer: B



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65. By using the properties of definite integrals, evaluate the integrals

$$\int_0^a \frac{\sqrt{x}}{\sqrt{x} + \sqrt{a-x}} dx$$

A. $\frac{a}{2}$

B. $2a$

C. $\frac{2a}{3}$

D. $\frac{\sqrt{a}}{2}$

Answer:



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66. Evaluate : $\int_0^{\frac{\pi}{4}} \log(1 + \tan x) dx$.

A. $\frac{\pi}{4}$

B. $\frac{\pi}{4} \log 2$

C. $\frac{\pi}{8} \log 2$

D. 0

Answer:



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67. Property 8: If $f(x)$ is a continuous function defined on $[-a; a]$ then

$$\int_{-a}^a f(x) dx = \int_0^a \{f(x) + f(-x)\} dx$$

A. $2 \int_0^a \{f(x) + f(-x)\} dx$

B. $2 \int_0^a \{f(x) - f(-x)\} dx$

C. $\int_0^a \{f(x) + f(-x)\} dx$

D. none of these

Answer:



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68. Let $[x]$ denote the greatest integer less than or equal to x . Then, $\int_0^{1.5} [x] dx = ?$

A. $\frac{1}{2}$

B. $\frac{3}{2}$

C. 2

D. 3

Answer:



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69. Let $[x]$ denote the greatest integer less than or equal to x . Then, $\int_1^{-1} [x] dx = ?$

A. -1

B. 0

C. $\frac{1}{2}$

D. 2

Answer:



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70. $\int_1^2 |x^2 - 3x + 2| dx = ?$

A. $\frac{-1}{6}$

B. $\frac{1}{6}$

C. $\frac{1}{3}$

D. $\frac{2}{3}$

Answer:



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71. $\int_{\pi}^{2\pi} |\sin x| dx = ?$

A. 0

B. 1

C. 2

D. none of these

Answer: C



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72. $\int_0^{1/\sqrt{2}} \frac{\sin^{-1} x}{(1-x^2)^{3/2}} dx = ?$

A. $\frac{1}{2}(\pi - \log 2)$

B. $\left(\frac{\pi}{2} - 2\log 2\right)$

C. $\left(\frac{\pi}{4} - \frac{1}{2}\log 2\right)$

D. none of these

Answer:



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

A. $\frac{1}{2}(\pi - \log 2)$

B. $\left(\frac{\pi}{2} - \log 2\right)$

C. $(\pi - 2\log 2)$

D. none of these

Answer: B



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