doubtnut
India's Number 1 Education App

MATHS

BOOKS - MARVEL MATHS (HINGLISH)

INTEGRATION - DEFINITE INTEGRALS

MULTIPLE CHOICE QUESTIONS (PART - A : Building - UP The BASE)

1. $\int_1^9 \sqrt{x}dx =$

A. $\frac{25}{3}$

B. $\frac{522}{3}$

C. $\frac{255}{3}$

D. $\frac{52}{3}$

Answer: D

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2. $\int_0^1 \sqrt{x+1}\, dx =$

A. $\frac{2}{3}(\sqrt{8}+1)$

B. $\frac{3}{2}(\sqrt{8}-1)$

C. $\frac{2}{3}(\sqrt{8}-1)$

D. $\frac{3}{2}(\sqrt{8}+1)$

Answer: C

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

A. $4 - 2\sqrt{3}$

B. $2\sqrt{3} - 4$

C. $4 + 2\sqrt{3}$

D. $4\sqrt{3} - 2$

Answer: A

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4. $\int_0^1 2^x dx =$

A. $\log 2$

B. $\log_2 e$

C. $\frac{1}{\log_2 e}$

D. 1

Answer: B

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5. $\int_0^2 \left(3x^2 + 2x - 1\right) dx =$

A. 7

B. 8

C. 9

D. 10

Answer: D

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6. $\int_0^1 \frac{x^2+3x+2}{\sqrt{x}}dx =$

A. $\frac{23}{5}$

B. $\frac{32}{5}$

C. $-\frac{32}{5}$

D. $\frac{5}{32}$

Answer: B

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7. $\int_0^1 \frac{3x^3 - 4x^2 + 1}{\sqrt{x}} dx =$

A. $\frac{44}{35}$

B. $-\frac{44}{35}$

C. $\frac{35}{44}$

D. $\frac{45}{34}$

Answer: A

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8. $\int_4^9 \frac{x - 1}{1 + \sqrt{x}} dx =$

A. $-\frac{23}{3}$

B. $-\frac{32}{3}$

C. $\frac{23}{3}$

D. $\frac{32}{3}$

Answer: C

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9. $\int_0^1 \frac{1}{\sqrt{x+3}+\sqrt{x+2}}dx =$

A. $\frac{4}{3}\left(\sqrt{2}-3\sqrt{3}+4\right)$

B. $\frac{2}{3}\left(8-6\sqrt{3}\right)$

C. $2+\sqrt{3}$

D. $\frac{4}{3}(\sqrt{2}+3\sqrt{3}-4)$

Answer: A

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10. $\int_0^1 \frac{x}{x+1}dx =$

A. $1+\log 2$

B. $\log 2-1$

C. $\log\left(\frac{e}{2}\right)$

D. $1-\log 2+e$

Answer: C

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11. Evaluate the following definite integral: $\int_0^1 \frac{1}{1+x^2}dx$

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

B. log 2

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

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

Answer: A

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12. Evaluate the following :

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

A. $2 - \frac{\pi}{4}$

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

C. $2 \log 2$

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

Answer: B

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13. Evaluate the following :

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

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

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

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

D. $\frac{\pi}{4} - 1$

Answer: C

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14. $\int_0^1 \frac{2 - x^2}{1 + x^2} dx =$

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

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

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

D. $\frac{3\pi}{4} - 1$

Answer: D

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15. $\int_{-1}^{1} \frac{x^2-1}{x^2+1} dx =$

A. $2-\pi$

B. $\pi-2$

C. $\pi+2$

D. $4-\pi$

Answer: A

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16. $\int_{1}^{3} \frac{1}{x+x^2} dx =$

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

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

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

D. $\log_2 3$

Answer: C

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17. $\int_0^1 \frac{1}{x^2+4x+5} dx =$

A. $\tan^{-1}\left(\frac{1}{7}\right)$

B. $\log\left(\frac{1}{7}\right)$

C. $\sin^{-1}\left(\frac{1}{7}\right)$

D. log 7

Answer: A

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18. $\int_1^2 \frac{1}{x^2 - 2x + 2} dx =$

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

B. 0

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

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

Answer: A

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19. $\int_2^3 \frac{1}{x^2+5x+6}dx =$

A. $\tan^{-1}\left(\frac{25}{24}\right)$

B. $\log\left(\frac{25}{24}\right)$

C. $\sin^{-1}\left(\frac{25}{24}\right)$

D. $\sec^{-1}\left(\frac{25}{24}\right)$

Answer: B

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20. $\int_2^3 \frac{1}{2x^2+3x-2}dx =$

A. $\frac{1}{5}\tan^{-1}\left(\frac{4}{3}\right)$

B. $\frac{1}{5}\log\left(\frac{4}{3}\right)$

C. $5\tan^{-1}\left(\frac{3}{4}\right)$

D. $5\log\left(\frac{3}{4}\right)$

Answer: B

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21. $\int_2^3 \frac{x}{(x+2)(x+3)}dx =$

A. $\log\left(\frac{6^3.4^2}{5^5}\right)$

B. $\log\left(\frac{3^6.2^4}{5^5}\right)$

C. $\log\left(\frac{24}{5}\right)$

D. $\log\left(\frac{4^2.5^3}{6^4}\right)$

Answer: A

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22. $\int_0^{a/2} \frac{a}{(x-a)(x-2a)} dx =$

A. $\log\left(\frac{3a}{2}\right)$

B. $\log\left(\frac{2a}{3}\right)$

C. $\log\left(\frac{3}{2}\right)$

D. $\log\left(\frac{3}{2a}\right)$

Answer: C

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23. $\int_2^5 \frac{1}{\sqrt{5+4x-x^2}}dx =$

A. $\frac{\pi}{6}$

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

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

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

Answer: D

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24. $\int_{-1/2}^1 \frac{1}{\sqrt{8+2x-x^2}}dx =$

A. $\frac{\pi}{6}$

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

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

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

Answer: A

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25. $\int_1^2 \sqrt{(x-1)(2-x)}dx =$

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

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

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

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

Answer: C

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

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

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

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

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

Answer: B

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

A. $\frac{\pi}{4}+\frac{1}{2}$

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

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

D. $\frac{\pi-2}{4}$

Answer: C

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

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

B. $1-\frac{\pi}{4}$

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

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

Answer: B

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29. If $\int_0^{\frac{\pi}{3}} \frac{\cos x}{3+4\sin x}dx = k\log\left(\frac{3+2\sqrt{3}}{3}\right)$, then k is equal to

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

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

C. $\frac{1}{8}$

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

Answer: D

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

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

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

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

D. $4 - \pi$

Answer: A

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31. $\int_{-\pi/4}^{\pi/4} \frac{dx}{1+\sin x} =$

A. 1

B. 2

C. 3

D. 4

Answer: B

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32. If $f(x) = \begin{cases} x^2, & \text{if } 0 \leq x \leq 1 \\ \sqrt{x}, & \text{if } 1 \leq x \leq 2, \end{cases}$

then $\int_0^2 f(x)dx =$

A. $\frac{1}{3} + \frac{4\sqrt{2}}{3}$

B. $\frac{4 - \sqrt{2}}{3}$

C. $\frac{4\sqrt{2}-1}{3}$

D. $\frac{1+4\sqrt{2}}{\sqrt{3}}$

Answer: C

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

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

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

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

D. $\frac{1}{5}$

Answer: B

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34. Evaluate : $(i)\int_0^{\pi/2}\cos^3 x dx$ $(ii)\int_0^{\pi/2}\sin^4 x dx$

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

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

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

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

Answer: A

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

A. 35

B. $\frac{1}{35}$

C. $\frac{2}{35}$

D. $\frac{1}{7}$

Answer: C

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

A. $\frac{8}{3}$

B. $\frac{3}{8}$

C. $\frac{33}{88}$

D. $\frac{88}{33}$

Answer: B

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

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

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

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

D. $\frac{\pi}{6}$

Answer: C

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38. $\int_0^{\pi/2} \frac{\cos x}{4 - \sin^2 x} dx =$

A. $\frac{1}{4}\log 3$

B. $\frac{1}{3}\log 4$

C. $4\log\left(\frac{1}{3}\right)$

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

Answer: A

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

A. $\log\left(\frac{4}{3}\right)$

B. $\log\left(\frac{3}{4}\right)$

C. $\log\left(\frac{\pi}{12}\right)$

D. $\frac{\pi}{2}\log\left(\frac{3}{4}\right)$

Answer: A

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40. Evaluate the following :

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

A. π

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

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

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

Answer: D

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41. $\int_0^{\pi/4} \frac{1-\tan x}{1+\tan x} dx =$

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

B. $\log 2$

C. $-\log 2$

D. $\log\left(\sqrt{2}\right)$

Answer: D

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42. $\int_{\pi/4}^{\pi/3} \frac{\sec x}{\sin x} dx =$

A. log 9

B. $\log\left(\sqrt{3}\right)$

C. log 3

D. log 8

Answer: B

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43. $\int_{0}^{\log 2} \frac{e^x}{1+e^x} dx =$

A. $\log 6$

B. $\log\left(\frac{2}{3}\right)$

C. $\log\left(\frac{3}{2}\right)$

D. $\log 8$

Answer: C

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44. $\int_0^1 \frac{e^{2x}-1}{e^{2x}+1}dx =$

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

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

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

D. $\log\left(1+e^2\right)$

Answer: B

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

A. $\sqrt{e}+e$

B. $e-\sqrt{e}$

C. $e^{1/e}$

D. $\sqrt{e}-\frac{1}{\sqrt{e}}$

Answer: B

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

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

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

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

D. 1

Answer: D

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47. $\int_{1}^{e^3} \frac{1}{x\sqrt{1+\log x}} dx =$

A. 1

B. 2

C. 3

D. 4

Answer: B

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

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

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

C. $\frac{\pi^2}{32}$

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

Answer: C

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49. $\int_{-1}^{1} \frac{1}{a^2 e^x + b^2 e^{-x}} dx =$

A. $\frac{1}{ab} \log\left(a^2 e^2 + b^2\right)$

B. $\frac{1}{ab} \log\left(a^2 + b^2 e^2\right)$

C. $\frac{1}{ab}\left[\tan^{-1}\left(\frac{ae}{b}\right) - \tan^{-1}\left(\frac{a}{be}\right)\right]$

D. $\frac{1}{ab} \tan^{-1}\left[\frac{ab\left(e^2 - 1\right)}{e^2 + 1}\right]$

Answer: C

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50. $\int_2^3 \frac{1}{x(x^3-1)}dx =$

A. $\frac{1}{3}\log\left(\frac{208}{189}\right)$

B. $\frac{1}{3}\log\left(\frac{26}{7}\right)$

C. $\frac{1}{3}\log\left(\frac{7}{26}\right)$

D. $\log\left(\frac{3}{2}\right)$

Answer: A

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51. $\int_0^1 x^3\sqrt{1-x^2}dx =$

A. $\frac{1}{15}$

B. $\frac{22}{15}$

C. $\frac{4}{15}$

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

Answer: D

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52. $\int_0^1 x^2\sqrt{1-x^2}dx =$

A. 1

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

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

D. $\frac{1}{15}$

Answer: C

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53. $\int_0^{\pi/2} \frac{1}{5+4\cos x} dx =$

A. $\frac{2}{3}\tan^{-1}\left(\frac{1}{3}\right)$

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

C. $\frac{1}{3}\tan^{-1}\left(\frac{2}{3}\right)$

D. $\frac{\pi}{6}$

Answer: A

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54. $\int_0^1 xe^x dx =$

A. 1

B. e^2

C. $1 + e^2$

D. 2

Answer: C

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55. $\int_e^{e^2} \log x dx =$

A. 1

B. e^2

C. $e^2 - 1$

D. $1 + e^2$

Answer: B

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56. $\int_1^2 x \log x dx =$

A. $\frac{3}{4} - (\log 4)$

B. $(\log 4) - \frac{3}{4}$

C. $e^2 - e$

D. $e + e^2$

Answer: B

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

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

B. $-\pi$

C. -2

D. 1

Answer: D

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58. $\int_0^{\frac{\pi}{2}} \frac{x}{1+\cos x} dx =$

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

B. $\frac{\pi}{4} - (\log 2)$

C. $\frac{\pi}{3} - (\log 2)$

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

Answer: D

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

A. $\frac{\pi}{4} - (\log 2)$

B. $\frac{\pi}{4} - \frac{1}{2}$

C. $\frac{\pi}{4} - 1$

D. $\frac{\pi}{4} + (\log 2)$

Answer: B

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60. $\int_0^{1/\sqrt{2}} \frac{x \sin^{-1} x}{\sqrt{1-x^2}} dx =$

A. $\frac{\pi}{4} + \frac{2}{\sqrt{2}}$

B. $\frac{\pi + 4}{4\sqrt{2}}$

C. $\frac{\pi}{4} - \frac{2}{\sqrt{2}}$

D. $\frac{\pi}{4} - \frac{1}{\sqrt{2}}$

Answer: B

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61. $\int_0^{\pi/4} e^x \left(1 + \tan x + \tan^2 x\right) dx =$

A. tan 1

B. e. tan 1

C. $e^{\pi/4}$

D. tan e

Answer: C

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62. $\int_0^{\pi/4} e^x \sin x dx =$

A. $\frac{e^{\pi/4}}{\sqrt{2}}$

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

C. $\sqrt{2}e^{\pi/4}$

D. $e^{\pi/4}$

Answer: B

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63. If $\int_0^1 f(x)dx = 1$ and $\int_1^2 f(y)dy = 2$, then $\int_0^2 f(z)dz =$

A. 1

B. -1

C. -3

D. 3

Answer: D

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64. If $\int_0^3 f(x)dx = 1$ and $\int_0^4 f(y)dy = 2$, then $\int_3^4 f(z)dz =$

A. 7

B. -1

C. 1

D. 3

Answer: C

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65. $\int_0^a \frac{f(x)}{f(x)+f(a-x)}dx =$

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

B. 2a

C. a

D. 3a

Answer: A

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66. $\int_a^b \frac{f(x)}{f(x)+f(a+b-x)}dx =$

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

B. $\frac{b-a}{2}$

C. $a+b$

D. $b-a$

Answer: B

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

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

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

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

D. $\frac{\pi}{6}$

Answer: C

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68. $\int_0^a \frac{1}{x+\sqrt{a^2-x^2}}dx$

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

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

C. $\log\left(a+\sqrt{a^2-1}\right)$

D. $\log\left(1+\sqrt{2}\right)$

Answer: B

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

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

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

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

D. $\frac{1}{5}$

Answer: A

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70. $\int_0^{\frac{\pi}{2}} \log(\tan x).\, dx$

A. $\log\left(\sec.\ \frac{\pi}{2}\right)$

B. not real

C. 1

D. 0

Answer: D

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71. $\int_0^{\pi/2} \sin 2x \log(\tan x)$ dx is equal to

A. 0

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

C. 1

D. -1

Answer: A

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

A. 1

B. 0

C. $\frac{4}{35}$

D. $\frac{35}{4}$

Answer: C

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

A. 0

B. log 2

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

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

Answer: C

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74. $\int_0^4 \frac{3\sqrt{x+5}}{3\sqrt{x+5}+3\sqrt{9-x}}dx =$

A. 1

B. 2

C. 3

D. 4

Answer: B

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75. $\int_4^7 \frac{(11-x)^2}{x^2+(11-x)^2}dx =$

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

B. 1

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

D. 2

Answer: C

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

A. 1

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

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

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

Answer: D

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77. $\int_{\pi/6}^{\pi/3} \cos^2 x dx =$

A. $\frac{\pi}{6}$

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

C. $\frac{\sqrt{3}-1}{2}$

D. $\frac{\sqrt{3}+1}{2}$

Answer: B

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78. $\int_0^{\pi/2} \frac{\sin x - \cos x}{1 - \sin x \cos x} dx =$

A. 1

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

C. 2

D. 0

Answer: D

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79. $\int_{-1/2}^{1/2} \frac{1}{\sqrt{1 - x^2} dx} =$

A. 1

B. π

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

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

Answer: D

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80. $\int_{-1}^{1} \frac{x^2}{1+x^2} dx =$

A. 1

B. π

C. $2 - \pi$

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

Answer: C

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81. $\int_{-2}^{2} \frac{x^3}{4-x^2} dx =$

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

B. 0

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

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

Answer: B

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82. $\int_{-\pi/2}^{\pi/2} \frac{\sin^4 x}{\sin^4 x + \cos^4 x} dx =$

A. 2

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

C. -2

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

Answer: D

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83. $\int_{-\pi/4}^{\pi/4} \sec^3 x \tan^3 x dx =$

A. 0

B. 1

C. $\frac{\pi}{4}+1$

D. 3

Answer: A

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84. $\int_1^8 \frac{x}{\sqrt{1+x}}dx =$

A. $\frac{2}{3}(18-\sqrt{2})$

B. $\frac{33}{2}$

C. $\frac{2}{3}(18+\sqrt{2})$

D. $\frac{43}{2}$

Answer: C

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85. $\int_0^1 \sqrt{\frac{e^x}{e^x + e^{-x}}} dx =$

A. $\log\left(e + \sqrt{1 + e^2}\right)$

B. $\log\left(\frac{e + \sqrt{1 + e^2}}{1 + \sqrt{2}}\right)$

C. $\log\left(\frac{e + \sqrt{1 + e^2}}{1 - \sqrt{2}}\right)$

D. $\log\left(e - \sqrt{1 - e^2}\right)$

Answer: B

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

A. 1

B. 2

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

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

Answer: D

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87. $\int_0^{\pi/2} \frac{a\sin x + b\cos x}{\sin x+\cos x} dx =$

A. $a\frac{\pi}{4}+b$

B. $a+b\frac{\pi}{4}$

C. $\frac{\pi}{4}(a+b)$

D. $\frac{\pi}{4(a+b)}$

Answer: C

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88. $\int_0^1 \frac{x^2}{2x^2-2x+1}dx =$

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

B. 1

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

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

Answer: D

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

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

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

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

D. 0

Answer: D

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90. $\int_{-1}^{1} |x| dx = ?$

A. 0

B. 1

C. 2

D. -2

Answer: B

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91. $\int_{-1}^{1} \frac{x^2 + x}{x^2 + 1} dx =$

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

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

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

D. 2

Answer: A

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92. $\int_0^1 \tan(2x - 1)dx =$

A. 0

B. tan 1

C. 1

D. -1

Answer: A

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93. $\int_0^{\pi} x \sin^2 x dx =$

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

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

C. $\frac{\pi^2}{4}$

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

Answer: C

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

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

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

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

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

Answer: B

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95. If $I_1 = \int_0^{\pi/2} \log(\sin x) dx$ and $I_2 = \int_0^{\pi/2} \log(\sin 2x) dx$, then

A. $I_1 < I_2$

B. $I_1 = I_2$

C. $I_1 > I_2$

D. $\sin x = \sin 2x$

Answer: B

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MULTIPLE CHOICE QUESTIONS (PART - B : Mastering The BEST)

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

A. 0

B. 1

C. 3

D. 2

Answer: D

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

A. log 3

B. 2 log 3

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

D. $\frac{1}{4}\log 3$

Answer: C

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3. $\int_{-\pi/2}^{\pi/2} \sqrt{1-\cos 2x}\,dx =$

A. $\sqrt{2}$

B. 2

C. $-2\sqrt{2}$

D. $2\sqrt{2}$

Answer: D

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4. $\int_{-\pi}^{\pi} \sqrt{1+\cos 4x}\,dx =$

A. 1

B. $2\sqrt{2}$

C. $4\sqrt{2}$

D. $3\sqrt{2}$

Answer: C

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5. $\int_{\pi/6}^{\pi/4} \left(\sec^2 x + \cos^2 x\right) dx =$

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

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

C. 2

D. $\sqrt{3}$

Answer: B

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6. $\int_{-\pi/2}^{\pi/2} \sqrt{1+\sin 2x}dx =$

A. $\sqrt{2}$

B. 2

C. 3

D. $-2\sqrt{2}$

Answer: B

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7. $\int_{-\pi/4}^{\pi/4} \sin^2 x dx =$

A. $\frac{\pi - 4}{8}$

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

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

D. π

Answer: B

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8. If $a > 0$, then : $\int_{-a}^{a} \frac{1}{\sqrt{a^2 - x^2}} dx =$

A. π

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

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

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

Answer: A

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9. $\int_{-a}^{a} \frac{1}{a^2 + x^2} dx =$

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

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

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

D. $\frac{\pi}{8a}$

Answer: B

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10. $\int_{-a}^{a} \frac{x^2}{a^2+x^2} dx =$

A. $\frac{a(\pi+4)}{2}$

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

C. $\frac{4-\pi}{2}$

D. $\frac{a(4-\pi)}{2}$

Answer: D

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11. $\int_{-1}^{1} \sqrt{1-x^2}dx =$

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

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

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

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

Answer: B

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12. $\int_{-1}^{1} \left[\cos^{-1} x\right]dx$ (where [.] denotes greatest integer function)

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

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

C. π

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

Answer: C

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13. $\int_0^7 \frac{1}{\sqrt{4+3x}} dx =$

A. 1

B. 2

C. 3

D. 4

Answer: B

Watch Video Solution

14. $\int_1^2 \frac{1}{x\sqrt{x^2-1}}dx =$

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

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

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

D. $\frac{\pi}{6}$

Answer: B

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

A. 224

B. 324

C. 432

D. 234

Answer: D

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16. $\int_0^1 \frac{\left(\cot^{-1}x\right)^2}{1+x^2}dx =$

A. $\frac{\pi^3}{8}$

B. $\frac{\pi^3}{64}$

C. $\frac{7\pi^3}{192}$

D. $\frac{\pi^3}{192}$

Answer: C

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17. $\int_1^e \frac{(\log x)^4}{x} dx =$

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

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

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

D. $\frac{1}{5}$

Answer: D

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18. $\int_{\pi/4}^{\pi/2} \frac{e^{\cot x}}{\sin^2 x} dx =$

A. $e - 1$

B. $e + 1$

C. e

D. $e - 2$

Answer: A

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

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

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

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

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

Answer: A

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20. $\int_0^4 \sqrt{16 - x^2} dx =$

A. -4π

B. 2π

C. 4π

D. -2π

Answer: C

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21. $\int_{-5}^{5} \sqrt{25-x^2}dx =$

A. $\frac{25\pi}{2}$

B. 25π

C. 50π

D. 75π

Answer: A

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22. $\int_0^{2/3} \sqrt{4-9x^2}dx =$

A. π

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

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

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

Answer: C

Watch Video Solution

23. $\int_0^1 \frac{x^5}{1+x^{12}}\,dx$

A. $\frac{\pi}{12}$

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

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

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

Answer: A

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24. $\int_0^1 \frac{x^4}{1+x^{10}}dx =$

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

B. $\frac{\pi}{10}$

C. $\frac{\pi}{20}$

D. $\frac{\pi}{25}$

Answer: C

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

A. -1

B. 0

C. 1

D. 2

Answer: B

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26. $\int_1^2 \frac{1}{x^2 - 4x + 7} dx =$

A. 0

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

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

D. $\frac{\pi}{6\sqrt{3}}$

Answer: D

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27. $\int_{1/2}^{1} \frac{1}{4x^2 - 4x + 10} dx =$

A. $\tan^{-1}\left(\frac{1}{3}\right)$

B. $\frac{1}{6}\tan^{-1}\left(\frac{1}{3}\right)$

C. $\frac{1}{8}\tan^{-1}\left(\frac{1}{3}\right)$

D. $-\frac{1}{6}\log 3$

Answer: B

Watch Video Solution

28. $\int_{4}^{5} \frac{1}{\sqrt{9x - 20 - x^2}} dx =$

A. 0

B. 1

C. π

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

Answer: C

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29. $\int_0^{16} \frac{16+x}{\sqrt{16-x}} dx =$

A. $\frac{460}{3}$

B. $\frac{640}{3}$

C. $\frac{406}{3}$

D. $\frac{604}{3}$

Answer: B

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

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

B. $\frac{5a\sqrt{a}}{3}$

C. $\frac{4a\sqrt{a}}{3}$

D. $\frac{10a\sqrt{a}}{3}$

Answer: D

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31. If $\int_0^b \frac{1}{3} + 27x^2 dx = \frac{16}{36}$, then b =

A. 3

B. 2

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

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

Answer: C

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32. $\int_0^{\pi/2} e^{\cos^2 x} \sin 2x dx =$

A. e

B. $e - 1$

C. $e + 1$

D. 1

Answer: B

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

A. $\log\left(\frac{4}{3}\right)$

B. $\log\left(\frac{16}{15}\right)$

C. $\log\left(\frac{15}{16}\right)$

D. $\log\left(\frac{3}{4}\right)$

Answer: B

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34. $\int_0^{\frac{\pi}{2}} \left(\frac{x}{\sin x}\right)^2 dx =$

A. $\log 2$

B. $-\pi \log 2$

C. $\pi \log 3$

D. $\log 3$

Answer: B

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35. $\int_0^{\pi/2} \frac{x}{\tan x} dx =$

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

B. $\log 2$

C. $\pi \log 3$

D. $\pi \log 4$

Answer: A

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36. $\int_0^{\pi} \sin 5x \cos 4x dx =$

A. $\frac{5}{9}$

B. $\frac{9}{5}$

C. $\frac{10}{9}$

D. $\frac{10}{3}$

Answer: C

Watch Video Solution

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

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

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

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

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

Answer: B

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38. $\int_0^{\pi/2} \frac{1}{2-\sin x} dx =$

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

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

C. $\frac{2\pi}{6\sqrt{3}}$

D. $\frac{5\pi}{4}$

Answer: C

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39. $\int_0^{\pi/2} \frac{1}{1+3\cos^2 x} dx =$

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

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

C. π

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

Answer: B

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40. $\int_0^{\pi/2} \frac{1}{4-3\sin^2 x} dx =$

A. π

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

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

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

Answer: D

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41. $\int_0^{\pi/2} \frac{1}{16\sin^2 x + 25\cos^2 x} dx =$

A. $\frac{\pi}{20}$

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

C. $\frac{\pi}{10}$

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

Answer: B

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42. $\int_0^{\pi} \frac{1}{41+40\cos x}dx =$

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

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

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

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

Answer: C

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43. $\int_0^{\pi} \frac{\sin x}{\sqrt{25-24\cos x}}dx =$

A. 2

B. 4

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

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

Answer: C

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44. $\int_0^{\pi} \frac{x \sin x}{1 - \sin x} dx =$

A. $\pi . \log 4$

B. $\pi \log 2$

C. 2 log 2

D. None of these

Answer: A

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

A. $\frac{1}{2}\log\left(\frac{5}{6}\right)$

B. $\frac{1}{2}\log\left(\frac{6}{5}\right)$

C. $\log\left(\frac{6}{5}\right)$

D. $\log\left(\frac{5}{6}\right)$

Answer: B

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46. $\int_0^2 x^2\sqrt{4-x^2}dx =$

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

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

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

D. π

Answer: D

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

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

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

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

D. $1-\frac{\pi}{2}$

Answer: C

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

A. $\frac{\pi}{6}$

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

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

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

Answer: A

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49. The value of $\int_0^1 \frac{\sin^{-1} x}{\sqrt{1-x^2}} dx$ is

A. $\frac{\pi^2}{4}$

B. $\frac{\pi^2}{8}$

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

D. π^2

Answer: B

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

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

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

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

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

Answer: A

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

A. $\frac{3}{16}$

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

C. $\frac{3\pi}{16}$

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

Answer: C

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52. $\int_0^{\pi/2} \sin^5 x dx =$

A. $\frac{15}{8}$

B. $\frac{8}{15}$

C. $\frac{8\pi}{15}$

D. $\frac{15\pi}{8}$

Answer: B

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

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

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

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

D. $\frac{\pi}{32}$

Answer: D

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54. $\int_0^{\pi/2} \sin^6 x \cos^2 x dx =$

A. $\frac{5}{256}$

B. $\frac{9\pi}{16}$

C. $\frac{5\pi}{256}$

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

Answer: C

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55. $\int_0^{\pi/2} \sin^4 x \cos^5 x dx =$

A. $\frac{8}{315}$

B. $\frac{315}{8}$

C. $\frac{256}{5}$

D. $\frac{225}{8}$

Answer: A

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56. $\int_0^{\pi/2} \sin^4 x \cos^6 x dx =$

A. $\frac{512\pi}{3}$

B. $\frac{3\pi}{512}$

C. $\frac{315\pi}{8}$

D. $\frac{3}{512}$

Answer: B

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57. $\int_0^{\pi/2} \sin^3 x \cos^4 x dx =$

A. $\frac{2}{35}$

B. $\frac{35}{2}$

C. $\frac{35\pi}{2}$

D. $\frac{2\pi}{35}$

Answer: A

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58. $\int_{-\pi/2}^{\pi/2} \sin^7 x dx =$

A. $\frac{7\pi}{16}$

B. $\frac{2\pi}{35}$

C. 2π

D. 0

Answer: D

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59. $\int_{-\pi/2}^{\pi/2} \cos^6 x dx =$

A. $\frac{16}{5}$

B. $\frac{5}{16}$

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

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

Answer: C

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60. If $I_n = \int_0^{\pi/4} \tan^n x dx$, then $7(I_6 + I_8) =$

A. 1

B. 2

C. 3

D. 4

Answer: A

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61. $\int_0^{\pi/2} \left(e^{\sin x} - e^{\cos x}\right) dx =$

A. 1

B. -1

C. 0

D. π

Answer: C

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

A. e^{π}

B. 0

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

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

Answer: D

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63. $\int_0^{\pi/2} \frac{f(\sec x)}{f(\sec x) + f(\operatorname{cosec} x)} dx =$

A. 0

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

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

D. 1

Answer: B

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64. The value of $\int 01 \tan^{-1}\left(\frac{2x-1}{1+x-x^2}\right)dx$ is (A) 1 (B) 0 (C) -1 (D) $\frac{\pi}{4}$

A. 0

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

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

D. 1

Answer: A

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

A. 0

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

C. 1

D. 2

Answer: B

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66. If $I_1 = \int_e^{e^2} \frac{dx}{\ln x}$ and $I_2 = \int_1^2 \frac{e^x}{x} dx$

A. $I_1 = I_2$

B. $2I_1 = I_2$

C. $I_1 = 2I_2$

D. $I_1 = 3I_2$

Answer: A

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67. If $\int_0^b \frac{1}{\sqrt{1+x} - \sqrt{x}} dx = \frac{2}{3}\left(2\sqrt{2}\right)$, then b =

A. 8

B. 4

C. 2

D. 1

Answer: D

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68. $\int_{\pi^2/16}^{\pi^2/4} \frac{\sin\sqrt{x}}{\sqrt{x}} dx =$

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

B. $2\sqrt{2}$

C. $\sqrt{2}$

D. $\frac{1}{\sqrt{2}}$

Answer: C

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69. If $\int_0^{b-c} f(x+c)dx = a\int_b^c f(x)dx$, then a =

A. 0

B. -1

C. 2

D. $b-c$

Answer: B

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70. If f and g are continuous functions on $[0, a]$ such that $f(x) = f(a - x)$ and $g(x) + g(a - x) = 2$, then show that $\int_0^a f(x)g(x)\,dx = \int_0^a f(x)\,dx$.

A. $\int_0^a f(x)dx$

B. $\int_0^a g(x)dx$

C. 0

D. $\int_0^{a/2} f(x)dx$

Answer: A

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71. $\int_1^2 \frac{1}{x+x^3}dx =$

A. $\log\left(\frac{8}{5}\right)$

B. $\log\left(\frac{5}{8}\right)$

C. $\frac{1}{2}\log\left(\frac{8}{5}\right)$

D. $\frac{1}{2}\log\left(\frac{5}{8}\right)$

Answer: C

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72. $\int_0^{\pi/2} \frac{1}{13+5\sin x}dx =$

A. $\tan^{-1}\left(\frac{2}{3}\right)$

B. $\frac{1}{6}\tan^{-1}\left(\frac{3}{2}\right)$

C. $6\tan^{-1}\left(\frac{2}{3}\right)$

D. $\frac{1}{6}\tan^{-1}\left(\frac{2}{3}\right)$

Answer: D

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73. $\int_0^{\pi/2} \frac{1}{5+13\sin x}dx =$

A. $-\frac{1}{12}\log 5$

B. $\frac{1}{12}\log 5$

C. $\frac{1}{12}$

D. $\frac{1}{5}\log 12$

Answer: B

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74. $\int_1^e \frac{1}{x\sqrt{\log x}}dx =$

A. 2

B. -2

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

D. $-\frac{1}{2}$

Answer: A

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75. $\int_1^2 \frac{1}{x\sqrt{\log x}} dx =$

A. $\sqrt{\log 2}$

B. 2

C. $2\sqrt{\log 2}$

D. 0

Answer: C

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76. $\int_1^e \frac{(\log x)^3}{x} dx =$

A. e^4

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

C. $\frac{1}{4}(e^4 - 1)$

D. 0

Answer: B

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77. $\int_1^3 \frac{1}{\sqrt{4x - x^2 - 3}} dx =$

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

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

C. π

D. 2π

Answer: C

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

A. $\int_0^a f(x)dx$

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

C. $\int_0^a f(a-2x)dx$

D. $\int_0^a f(a+2x)dx$

Answer: B

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79. $\int_0^{\pi} \left(\cos^4 x - \sin^4 x\right)dx =$

A. 2

B. -2

C. 0

D. 4

Answer: C

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80. If $\int_0^{\pi/2} \sin^4 x \cos^2 x dx = \frac{\pi}{32}$, then $\int_0^{\pi/2} \sin^2 x \cos^4 x dx =$

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

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

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

D. $\frac{\pi}{32}$

Answer: D

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81. $\int_0^{\pi/4} \sqrt{\frac{1-\sin 2x}{1+\sin 2x}} dx =$

A. log 2

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

C. 2 log 2

D. 4 log 2

Answer: B

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

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

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

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

D. 0

Answer: A

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

A. 0

B. 1

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

D. π

Answer: B

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84. $\int_{\sqrt{2}/3}^{\sqrt{3}/3} \frac{1}{\sqrt{4-9x^2}} dx =$

A. $\frac{\pi}{36}$

B. $\frac{\pi}{9}$

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

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

Answer: A

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

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

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

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

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

Answer: D

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86. $\int_0^1 \frac{1}{x+\sqrt{x}} dx =$

A. $-2\log 2$

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

C. $\log 2$

D. $2\log 2$

Answer: D

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87. $\int_0^{\pi/4} \frac{\sin^9 x}{\cos^{11} x} dx =$

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

B. $\frac{1}{10}$

C. $-\frac{1}{10}$

D. 0

Answer: B

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88. $\int_0^{\pi/4} \left(\tan^4 x + \tan^2 x\right) dx =$

A. 1

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

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

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

Answer: C

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89. $\int_2^3 \frac{1}{x^2 - x} dx =$

A. $\log\left(\frac{2}{3}\right)$

B. $\log\left(\frac{4}{3}\right)$

C. $\log\left(\frac{8}{3}\right)$

D. $-\log 4$

Answer: B

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90. $\int_0^3 \frac{x+1}{x^2+9} dx =$

A. $\frac{\pi}{12}\log(2\sqrt{2})$

B. $\frac{\pi}{12} + \log(\sqrt{2})$

C. $\frac{\pi}{6}\log(2\sqrt{2})$

D. $\frac{\pi}{3}\log(2\sqrt{2})$

Answer: B

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91. If $\int_0^\pi x f(\sin x) dx = a \int_0^\pi f(\sin x) dx$, then a =

A. π

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

C. 2π

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

Answer: D

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92. $\int_0^{\pi/2} \frac{1}{1+\tan^3 x} dx =$

A. 0

B. 1

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

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

Answer: D

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93. Evaluate $\int_0^1 \tan^{-1}\left(\frac{1}{1-x+x^2}\right)dx$

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

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

C. $2\int_0^1 \tan^{-1} x dx$

D. 0

Answer: C

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94. If $2\int_0^1 \tan^{-1} x dx = \int_0^1 \cot^{-1}(1-x+x^2)dx$ then $\int_0^1 \tan^{-1}(1-x+x^2)dx =$

A. 2

B. $\log 2$

C. $-\log 2$

D. 0

Answer: B

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95. $\int_0^{\pi} \frac{e^{\cos x}}{e^{\cos x}+e^{-\cos x}}dx =$

A. π

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

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

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

Answer: C

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96. $\int_1^e \frac{1}{6x(\log x)^2 + 7x\log x + 2x} dx =$

A. $\log\left(\frac{15}{2}\right)$

B. $\log\left(\frac{6}{5}\right)$

C. $\log\left(\frac{3}{10}\right)$

D. $\frac{1}{5}\log\left(\frac{8}{3}\right)$

Answer: B

Watch Video Solution

97. $\int_0^2 \sqrt{\frac{2+x}{2-x}}dx$ is equal to

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

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

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

D. $2+\pi$

Answer: D

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98. $\int_{\pi/6}^{\pi/3} \frac{1}{1+\tan x} dx =$

A. π

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

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

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

Answer: D

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99. $\int_{\log\sqrt{\pi/2}}^{\log\sqrt{\pi}} \left(e^{2x}\sec^2\left(\frac{1}{3}e^{2x}\right)\right) dx$ is equal to:

A. $\sqrt{3}$

B. $\frac{1}{\sqrt{3}}$

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

D. $\frac{1}{2\sqrt{3}}$

Answer: A

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100. $\int_{-a}^{a} x^2 \frac{e^{x^3} - e^{-x^3}}{e^{x^3} + e^{-x^3}} dx =$

A. 0

B. a

C. $2\int_{0}^{a} x^2 \frac{e^{x^3} - e^{-x^3}}{e^{x^3} + e^{-x^3}} dx$

D. 1

Answer: A

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101. If $\int_a^b \frac{f(a+b-x)}{f(x)+f(a+b-x)}dx = 4$, then (a, b) can have the values

A. $(-2, 10)$

B. (10, 18)

C. (8, 0)

D. (10, 14)

Answer: B

Watch Video Solution

102. If $f(a+b-x)=f(x)$, then $\int_a^b xf(x)dx=$

A. $\frac{a-b}{2}\int_a^b f(x)dx$

B. $\frac{a+b}{2}\int_a^b f(x)dx$

C. 0

D. $b-a$

Answer: B

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103. $\frac{1}{c}\int_{ac}^{bc} f\left(\frac{x}{c}\right)dx=$

A. $\frac{1}{c}\int_a^b f(x)dx$

B. $\int_{ac^2}^{bc^2} f(x)dx$

C. $c\int_{a}^{b} f(x)dx$

D. $\int_{a}^{b} f(x)dx$

Answer: D

Watch Video Solution

104. $\int_{-2}^{2} \frac{1}{1+e^{x^3}}dx =$

A. $\frac{e^2}{1+e^8}$

B. 4

C. 2

D. 1

Answer: C

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105. If $f(x) + f(2 - x) = 0$, then $\int_0^2 \frac{1}{1 + 2^{f(x)}} dx =$

A. 2

B. 1

C. f (2)

D. $\frac{1}{2} f(2)$

Answer: B

Watch Video Solution

106. If f is an odd function and $I = \int_{-a}^{a} \frac{f(\sin x)}{f(\cos x) + f\left(\sin^2 x\right)} dx$, then

A. I can't be evaluated

B. I = 0

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

D. I = 1

Answer: B

Watch Video Solution

107. If $\int_{-1}^{4} f(x)dx = 4$ and $\int_{2}^{4} [3 - f(x)]dx = 7$, then $\int_{2}^{-1} f(x)dx =$

A. 2

B. -3

C. -5

D. 1

Answer: C

Watch Video Solution

108. $\int_{-1}^{1} \frac{x^2 + \sin x}{1 + x^2} dx =$

A. 0

B. 2

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

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

Answer: D

Watch Video Solution

109. $\int_{-\pi/4}^{\pi/4} \frac{e^x x \sin x}{e^{2x} - 1} dx =$

A. e

B. 0

C. 2

D. 1

Answer: B

Watch Video Solution

110. $\int_0^a [f(x) + f(a-x)]dx =$

A. $\int_0^a f(a)dx$

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

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

D. $2\int_0^a f(x)dx$

Answer: D

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111. If n is an integer, then $\int_0^{\pi} \frac{\sin 2nx}{\sin x}dx =$

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

B. 0

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

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

Answer: B

Watch Video Solution

112. If $\int_0^1 \frac{1}{\sqrt{x+1}-\sqrt{x}}dx = \frac{a\left(\sqrt{2}\right)}{3}$, then a =

A. $\sqrt{2}\left(2\sqrt{2}-2\right)$

B. $\sqrt{2}\left(2-2\sqrt{2}\right)$

C. $\frac{2}{3}\left(2\sqrt{2}-2\right)$

D. 4

Answer: D

Watch Video Solution

113. If $A(x) = \int_0^x t^2 \, dt$, then : A (3) =

A. 27

B. 3

C. 9

D. 81

Answer: C

Watch Video Solution

114. Given $\int_1^5 f = 3, \int_2^6 f = 4$ and $\int_5^6 f = 5$. If F' = f and F (1) = 6, then F (2) =

A. 7

B. 12

C. 10

D. 8

Answer: C

Watch Video Solution

115. If the graph of the function y = f(x) passes through the points (1, 2) and (3, 5), then $\int_1^3 f'(x)dx =$

A. 1

B. 2

C. 3

D. 4

Answer: C

Watch Video Solution

116. $\int_0^1 \left[\frac{d}{dx}\left(\sqrt{1+x^3}\right)\right]dx =$

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

B. $\sqrt{2}-1$

C. $\sqrt{2}$

D. 2

Answer: B

Watch Video Solution

117. If $\int_n^{n+1} f(x)dx = n^2$, where n is an integer, then $\int_{-2}^{4} f(x)dx =$

A. 0

B. 9

C. 19

D. 91

Answer: C

Watch Video Solution

118. $\int_0^{2\pi} e^{\sin^2 nx}.\tan nx\, dx =$

A. 0

B. π

C. 1

D. 2

Answer: A

Watch Video Solution

119. $\int_{-a}^{a} \{f(x) - f(-x)\}dx =$

A. $2\int_0^a f(x)dx$

B. 0

C. $\int_0^a f(2a-x)dx$

D. f (a)

Answer: B

Watch Video Solution

120. $\int_{-\pi/2}^{\pi/2} x \sin x \cos x dx =$

A. 0

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

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

D. 2

Answer: C

Watch Video Solution

121. $\int_{-2}^{2} \frac{1}{1+e^{x^3}} dx =$

A. 2

B. 4

C. $\frac{e^2}{1+e^8}$

D. 1

Answer: A

Watch Video Solution

122. $\int_1^7 \frac{\log\sqrt{x}}{\log\sqrt{8-x}+\log\sqrt{x}}dx =$

A. 2

B. 4

C. 3

D. 1

Answer: C

Watch Video Solution

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

A. $\log\left(\frac{3}{4}\right)$

B. $-\log\left(\frac{3}{4}\right)$

C. $2\log\left(\frac{4}{3}\right)$

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

Answer: B

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124. If $\int_0^1 \frac{x+4}{x^2+5}dx = a\log\left(\frac{6}{5}\right) + b\tan^{-1}\left(\frac{1}{\sqrt{5}}\right)$, then $(a, b) \equiv$

A. $\left(\frac{1}{3}, \frac{3}{\sqrt{5}}\right)$

B. $\left(\frac{1}{2}, \frac{4}{\sqrt{5}}\right)$

C. $\left(\frac{1}{4}, \frac{2}{\sqrt{5}}\right)$

D. $(2, 4\sqrt{5})$

Answer: B

Watch Video Solution

125. $\int_{-1}^{1} \frac{d}{dx}\left[\tan^{-1}\left(\frac{1}{x}\right)\right] dx =$

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

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

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

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

Answer: A

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126. If $a, b, > 0$, then $\int_1^a \frac{1}{x}dx + \int_1^b \frac{1}{x}dx =$

A. $\int_1^{a+1} \frac{1}{x}dx$

B. $\int_a^b \frac{1}{x}dx$

C. $\int_1^{ab} \frac{1}{x}dx$

D. $\int_{1/a}^{1/b} xdx$

Answer: C

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127. If $\int_0^1 \frac{1}{e^x + e^{-x}}dx = \tan^{-1} p$, then : p =

A. $\frac{e^2-1}{e^2+1}$

B. $\frac{e-1}{e+1}$

C. $\frac{1-e}{1+e}$

D. $\frac{e-1}{1+e^2}$

Answer: B

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128. $\int_0^{\pi/2} \frac{\sin 8x . \log(\cot x)}{\cos 2x} dx =$

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

B. $\frac{\pi}{8}\log\left(\frac{1}{2}\right)$

C. 0

D. 1

Answer: C

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129.

$$\int_{-1}^{1}\left[\tan^{-1}\left\{\sin\left(\cos^{-1}x\right)\right\}+\cot^{-1}\left\{\cos\left(\sin^{-1}x\right)\right\}dx=\right.$$

A. $-\pi$

B. π

C. $\pi/2$

D. 0

Answer: B

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130. $\int_0^{\pi} \frac{\cos x}{x^4 + (\pi - x)^4} dx =$

A. 0

B. π

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

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

Answer: A

Watch Video Solution

131. If $I_n = \int_0^{\pi/4} \tan^n x dx$, where $n \geq 2$, then : $I_{n-2} + I_n =$

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

B. $\frac{1}{n-1}$

C. $\frac{1}{n} + \frac{1}{n-1}$

D. $\frac{1}{n+1}$

Answer: B

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132. Find the value of $\int_0^1 x(1-x)^n dx$

A. $\frac{n(n+1)}{2}$

B. $\frac{1}{(n+1)(n+2)}$

C. $\frac{(n+1)(n+2)}{3}$

D. $n^2(n+1)$

Answer: B

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133. If $\int_a^b x^3 dx = 0, and If \int_a^b x^2 dx = \frac{2}{3}, find real values of a$ find $a and b$.

A. $a = 2, b = 3$

B. $a = 1, b = -1$

C. $a = 3, b = 2$

D. $a = -1, b = 1$

Answer: D

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134. Evaluate the following: $\int_0^{\pi/4} \frac{\sin^2 x \cos^2 x}{\left(\sin^3 x + \cos^3 x\right)^2} dx$

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

B. $\frac{1}{12}$

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

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

Answer: A

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135. If $f(x) = f(4-x), g(x) + g(4-x) = 3$ and $\int_0^4 f(x)dx = 2$, then : $\int_0^4 f(x)g(x)dx =$

A. 3

B. 6

C. 2

D. 5

Answer: A

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136. If $f(a-x)=f(x)$ and $\int_0^{a/2} f(x)dx = p$, then : $\int_0^a f(x)dx =$

A. 0

B. p

C. 2p

D. 3p

Answer: C

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137. Evaluate: $\int_{-\frac{1}{2}}^{\frac{1}{2}} \cos x \frac{\log(1-x)}{1+x} dx$

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

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

C. 2

D. 0

Answer: D

Watch Video Solution

138. $\int_{-\pi}^{\pi}(1-x^2)\sin x\cos^2 x dx =$

A. 0

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

C. $2\pi-\pi^3$

D. $\frac{7}{2} - 2\pi^3$

Answer: A

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139. If $f(x) = x, \quad ....x < 1$
$= x - 1, \ ....x \geq 1,$
then : $\int_0^2 x^2 f(x) dx =$

A. 1

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

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

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

Answer: C

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140. If $0 \leq \alpha \leq 2\pi$ and $\int_0^{\alpha} \cos x dx = \cos 2\alpha$, the : $\alpha =$

A. $\frac{\pi}{6}$

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

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

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

Answer: A

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141. $\int_{-2}^{3} \left[\cot^{-1}\left(\frac{x-1}{x+1}\right) + \cot^{-1}\left(\frac{x+1}{x-1}\right) \right] dx =$

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

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

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

D. $2\cot^{-1} e$

Answer: A

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142. If $f(x) + f(\pi - x) = 1$ and $g(x) + g(\pi - x) = 1$, then : $\int_0^{\pi} [f(x) + g(x)]dx =$

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

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

C. 2π

D. π

Answer: D

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143. $\int_0^{\pi/2} \frac{1}{\sqrt{\tan x} - \sqrt{\cot x}} dx =$

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

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

C. 0

D. 1

Answer: C

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144. If $\int_{-3}^{2} f(x)dx = 2$ and $\int_{2}^{5} [5 + f(x)]dx = 9$, then : $\int_{5}^{-3} f(x)dx =$

A. 2

B. 3

C. 4

D. 5

Answer: C

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145. If $\frac{d}{dx}[g(x)] = f(x)$, then : $\int_a^b f(x)g(x)dx =$

A. $\frac{1}{2}\left\{[f(b)]^2 - [f(a)]^2\right\}$

B. $f(b) - f(a)$

C. $g(b) - g(a)$

D. $\frac{1}{2}\left\{[g(b)]^2 - [g(a)]^2\right\}$

Answer: D

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146. If $\int_0^1 f(x)dx = 1, \int_0^1 xf(x)dx = a$ and $\int_0^1 x^2 f(x)dx = a^2$, then : $\int_0^1 (a-x)^2 f(x)dx =$

A. $4a^2$

B. 0

C. $2a^2$

D. $3a^2$

Answer: B

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

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

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

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

D. 1

Answer: B

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

A. $\frac{\pi\sqrt{2}}{4}$

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

C. 0

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

Answer: C

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

A. 1

B. 2

C. -1

D. -2

Answer: B

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150. $\int_{-\pi/2}^{\pi/2} \frac{1}{1+e^{\sin x}}dx =$

A. 0

B. 1

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

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

Answer: D

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151. The value of the definite integral $\int_0^1 \left(\frac{1}{x^2+2x\cos\alpha+1}\right)dx$ for $0<\alpha<\pi$ is equal

A. $\sin\alpha$

B. $\alpha.\sin\alpha$

C. $\frac{a}{2\sin\alpha}$

D. $\frac{\alpha}{2}.\sin\alpha$

Answer: C

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152. If $\int_0^a \frac{g(x)}{f(x)+f(a-x)}dx = 0$, then

A. g (x) is odd

B. $f(x) = f(a-x)$

C. $g(x) = -g(a-x)$

D. $f(a-x) = g(x)$

Answer: C

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153. $\int_1^e x^x dx + \int_1^e x^x \log x dx =$

A. $e^{1/e} - 1$

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

C. $e^e - 1$

D. $2e^e$

Answer: C

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154. If $I_1 = \int_0^{\pi/2} x \sin x dx$ and $I_2 = \int_0^{\pi/2} x \cos x dx$,then which one of the following is true ?

A. $I_1 + I_2 = \frac{\pi}{2}$

B. $I_1 = \frac{\pi}{2} I_2$

C. $I_1 + I_2 = 0$

D. $I_1 = I_2$

Answer: A

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155. $\int_{-10}^{10} \log\left(\frac{a+x}{a-x}\right) dx =$

A. $-2\log(a+10)$

B. $2\log\left(\frac{a+10}{a-10}\right)$

C. 0

D. 20 log a

Answer: C

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156. $\int_0^1 \frac{dx}{[ax+(1-x)b]^2} =$

A. ab

B. $\frac{a}{b}$

C. $\frac{b}{a}$

D. $\frac{1}{ab}$

Answer: D

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157. If $\int_0^1 \frac{dx}{(1+x)\sqrt{1-x^2}} = \frac{a}{b}$, then

A. $a = \pi, b = \sqrt{2}$

B. $a = \pi, b = 2\sqrt{2}$

C. $a = \frac{\pi}{2}, b = 2\sqrt{2}$

D. $a = b$

Answer: D

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158. $\int_2^3 f(5-x)dx - \int_2^3 f(x)dx =$

A. 1

B. 0

C. -1

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

Answer: B

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159. If $I_1 = \int_a^{1-a} x.\, e^{x(1-x)}\, dx$ and $I_2 = \int_a^{1-a} e^{x(1-x)}\, dx,$

then $I_1 : I_2 =$

A. 1

B. $1:2$

C. 0

D. 2

Answer: B

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160. $\int_0^{\pi/4} \left(\cos^2 x - \cos^4 x\right) dx$

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

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

C. $\frac{\pi}{32}$

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

Answer: C

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161. $\int_0^1 \left\{\sin^{-1} x + \cos^{-1}(1-x)\right\} dx =$

A. π

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

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

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

Answer: D

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162. $\int_0^{\pi/2} \left\{ \frac{d^2}{dx^2}(\sin x) \right\} dx =$

A. 1

B. -1

C. 0

D. 2

Answer: B

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163. $\int_{-1}^{1} \left(e^x - e^{-x}\right) dx =$

A. 0

B. 2

C. 2e

D. e

Answer: A

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164. $\int_{-\pi}^{\pi} \sin^2 x . \cos^2 x dx =$

A. 0

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

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

D. 1

Answer: C

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165. $\int_a^b \frac{\log x}{x}\, dx = \frac{1}{2}\log(ab)\,\log\left(\frac{b}{a}\right)$

A. $\log\left(\frac{\log b}{\log a}\right)$

B. $\log(ab).\log\left(\frac{b}{a}\right)$

C. $\frac{1}{2}.\log(ab).\log\left(\frac{b}{a}\right)$

D. $\frac{1}{2}.\log(ab).\log\left(\frac{a}{b}\right)$

Answer: C

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

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

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

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

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

Answer: D

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167. $\int_0^{\pi/2} \frac{dx}{2+\cos x} =$

A. $\frac{1}{\sqrt{3}}.\tan^{-1}\left(\frac{1}{\sqrt{3}}\right)$

B. $\sqrt{3}.\tan^{-1}(\sqrt{3})$

C. $\frac{2}{\sqrt{3}}.\tan^{-1}\left(\frac{1}{\sqrt{3}}\right)$

D. $2\sqrt{3}.\tan^{-1}(\sqrt{3})$

Answer: C

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

A. $a(\sqrt{2}-1)$

B. $a(1-\sqrt{2})$

C. $a(1+\sqrt{2})$

D. $2a\sqrt{3}$

Answer: A

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

A. $\frac{\pi}{4} + \frac{1}{2}.\log 2$

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

C. $\frac{\pi}{4} - \frac{1}{2}.\log 2$

D. $\frac{\pi}{4} - \log 2$

Answer: C

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

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

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

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

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

Answer: D

Watch Video Solution

171. The value of the integral $\int_0^1 \frac{dx}{x^2+2x\cos\alpha+1}, 0<\alpha<\pi$ is

A. $\sin\alpha$

B. $\tan^{-1}(\sin\alpha)$

C. $\alpha.\sin\alpha$

D. $\frac{\alpha}{2.\sin\alpha}$

Answer: D

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172. If : $x\left(x^4+1\right).f(x)=1$, then : $\int_1^2 f(x)dx=$

A. $\frac{1}{4}.\log\left(\frac{32}{17}\right)$

B. $\frac{1}{2}.\log\left(\frac{32}{17}\right)$

C. $\frac{1}{4}.\log\left(\frac{16}{17}\right)$

D. none of these

Answer: A

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

A. 3

B. 1

C. 2

D. 0

Answer: C

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174. If : $\int_0^{2a} f(x)dx = 2.\int_0^{a} f(x)dx$, then :

A. $f(2a-x) = -f(x)$

B. $f(2a-x) = f(x)$

C. $f(a-x) = -f(x)$

D. $f(a-x) = f(x)$

Answer: B

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175. $If I = \int_0^{\pi/4} \sin^2 x \quad dx$ and $J = \int_0^{\pi/4} \cos^2 x \quad dx.$

then

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

B. 2J

C. J

D. $\frac{1}{2}.J$

Answer: A

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176. $\int_{-1}^{1}\left(\sqrt{1+x+x^2}-\sqrt{1-x+x^2}\right)dx =$

A. 0

B. 1

C. -1

D. none of these

Answer: A

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177. Evaluate: $\int_0^{\frac{\pi}{2}} \log\left(\frac{4+3\sin x}{4+3\cos x}\right) dx$

A. 2

B. $3/4$

C. 0

D. none of these

Answer: C

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178. Suppose f is such that $f(-x) = -f(x)$ for every real x and $\int_0^1 f(x)dx = 5$, then $\int_{-1}^0 f(t)dt =$

A. 10

B. 5

C. 0

D. -5

Answer: D

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179. If $f(x) = \tan x - \tan^3 x + \tan^5 x - \ldots . \infty$ with $0 < x < \frac{\pi}{4}$ then $\int_0^{\pi/4} f(x)dx$ is equal to

A. 1

B. 0

C. $1/4$

D. $1/2$

Answer: C

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180. $\int_{\frac{1}{n}}^{\frac{an-1}{n}} \frac{\sqrt{x}}{\sqrt{a-x}+\sqrt{x}} dx =$ (A) $\frac{a}{2}$ (B) $\frac{na+2}{2n}$ (C) $\frac{na-2}{2n}$ (D) none of these

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

B. $\frac{an+2}{2n}$

C. $\frac{an-2}{2n}$

D. none of these

Answer: C

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181. Let a, b and c be non - zero real numbers such that $\int_0^3 (3ax^2+2bx+c)dx = \int_1^3 (3ax^2+2bx+c)dx$, then

A. $a+b+c=3$

B. $a+b+c=1$

C. $a+b+c=0$

D. $a+b+c=2$

Answer: C

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182.

$$\lim_{n\to\infty}\left[\frac{n}{1+n^2}+\frac{n}{4+n^2}+\frac{n}{9+n^2}+\ldots+\frac{1}{2n^2}\right]=$$

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

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

C. 1

D. none of these

Answer: B

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183. Evaluate

$$\lim_{n \to \infty} \left[\frac{1^2}{n^3 + 1^3} + \frac{2^2}{n^3 + 2^3} + \frac{3^2}{n^3 + 3^3} + \ldots . \frac{1}{2n} \right]$$

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

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

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

D. none of these

Answer: B

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184. $\lim_{n \to \infty} \frac{1}{n} \sum_{r=1}^{2n} \frac{r}{\sqrt{n^2 + r^2}}$ equals

A. $1 + \sqrt{5}$

B. $\sqrt{5} - 1$

C. $\sqrt{2} - 1$

D. $1 + \sqrt{2}$

Answer: B

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185. $\lim_{n \to \infty} \frac{1^p + 2^p + 3^p + \ldots\ldots\ldots + n^p}{n^{p+1}}$

A. $\frac{1}{p+1}$

B. $\frac{1}{1-p}$

C. $\frac{1}{p} - \frac{1}{1-p}$

D. $\frac{1}{p+2}$

Answer: A

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186. The solution for x of the equation $\int_{\sqrt{2}}^{x} \frac{dt}{t\sqrt{t^2-1}} = \frac{\pi}{2}$ is: (1) 2 (2) π (3) $\frac{\sqrt{3}}{2}$ (4) $2\sqrt{2}$

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

B. $2\sqrt{2}$

C. 2

D. $-\sqrt{2}$

Answer: D

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

A. 2π

B. e^{π}

C. 0

D. $2\sqrt{2}$

Answer: C

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188. Evaluate : $\int_0^{\frac{\pi}{2}} (2\log\sin x - \log\sin 2x)\, dx$

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

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

C. $\pi\log 2$

D. $-\pi\log 2$

Answer: B

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189. If $\int_0^{\pi} x f(\sin x)dx = A\int_0^{\frac{\pi}{2}} f(\sin x)dx$, then A is

A. 2π

B. π

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

D. 0

Answer: B

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190. The integral $\int_0^a \frac{g(x)}{f(x)+f(a-x)}dx$ vanishes, if

A. g(x) is an odd function

B. $f(x) = f(a-x)$

C. $g(x) = -g(a-x)$

D. $f(a-x)=g(x)$

Answer: C

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191. If $I_n=\int_0^{\pi/4}\tan^n x dx$, then $\frac{1}{I_2+I_4},\frac{1}{I_3+I_5},\frac{1}{I_4+I_6},\ldots$ from

A. an A.P.

B. a G.P.

C. a H.P.

D. none of these

Answer: A

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192. The value $\int_{-2}^{2}\left(p\log\left(\frac{1+x}{1-x}\right)+q\log\left(\frac{1-x}{1+x}\right)^{-2}+r\right)dx$ depends on the value of

A. p

B. q

C. r

D. p and q

Answer: C

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193. $\lim_{n \to \infty} \frac{\left(\sum_{r=1}^{n} r^2\right)\left(\sum_{r=1}^{n} r^3\right)}{\left(\sum_{r=1}^{n} r^6\right)} =$

A. 1

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

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

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

Answer: D

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194. If : $\int_0^{\pi} \ln(\sin x)dx = k$, then : $\int_0^{\pi/4} \ln(1+\tan x) =$

A. $-\frac{k}{4}$

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

C. $-\frac{k}{8}$

D. $\frac{k}{8}$

Answer: C

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

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

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

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

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

Answer: B

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196. $\int_{-\pi/2}^{\pi/2} \left(\sin^2 x . \cos^2 x (\sin x + \cos x)\right) dx =$

A. $\frac{15}{4}$

B. $\frac{4}{15}$

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

D. $\frac{16}{5}$

Answer: B

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197. If : $\int_{\ln 2}^{x} \frac{1}{\sqrt{e^t - 1}} dt = \frac{\pi}{6}$, then : x =

A. ln 1

B. ln 2

C. ln 3

D. ln 4

Answer: D

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198. $\int_{0}^{\pi/2} \sin x . \cos x . \sqrt{a^2 . \sin^2 x + b^2 . \cos^2 x} dx =$

A. $\frac{a^2 + ab + b^2}{2(a + b)}$

B. $\frac{a^2 + ab + b^2}{a + b}$

C. $\frac{a^2+ab+b^2}{3(a+b)}$

D. none of these

Answer: C

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199. If $\int_0^\infty \frac{x^2\,dx}{(x^2+a^2)(x^2+b^2)(x^2+c^2)} = \frac{\pi}{2(a+b)(b+c)(c+a)}$, then value of $\int_0^\infty \frac{dx}{(x^2+4)(x^2+9)}$ is (i) $\frac{\pi}{60}$ (ii) $\frac{\pi}{20}$ (iii) $\frac{\pi}{40}$ (iv) $\frac{\pi}{80}$

A. $\frac{\pi}{60}$

B. $\frac{\pi}{20}$

C. $\frac{\pi}{40}$

D. $\frac{\pi}{13}$

Answer: A

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200. $\int_0^2 \frac{2x-2}{2x-x^2}$dx is equal to

A. 0

B. 2

C. 3

D. 4

Answer: A

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201. $\int_1^{e^{99}} \frac{\sin(\pi . \ln x)}{x} dx =$

A. 0

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

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

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

Answer: C

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202. Evaluate :

$$\lim_{n \to \infty} \frac{1^4 + 2^4 + 3^4 + \ldots + n^4}{n^5} - \lim_{n \to \infty} \frac{1^3 + 2^3 + \ldots + n^3}{n^5}$$

A. $\frac{1}{30}$

B. 0

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

D. $\frac{1}{5}$

Answer: D

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

A. 0

B. 1

C. 2

D. 3

Answer: C

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204. The value of $\int \frac{8\log(1+x)}{1+x^2}dx$ is

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

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

C. $\log 2$

D. $\pi.\log 2$

Answer: D

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205. Find

$$\lim_{n \to \infty} \left(\frac{1}{n+1} + \frac{1}{n+2} + \ldots + \frac{1}{6n} \right)$$

A. log 2

B. log 3

C. log 6

D. 0

Answer: C

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206. $\frac{x . \sin^{-1} x^2}{\sqrt{1 - x^4}}$

A. $\frac{6-\pi\sqrt{3}}{12}$

B. $\frac{4-3\sqrt{3}.\pi}{12}$

C. $6-\frac{\pi}{6}$

D. none of these

Answer: A

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207. $\int_0^{2\pi} \frac{x\sin^{2n}x}{\sin^{2n}x+\cos^{2n}x}dx, n>0$, is equal to

A. π

B. π^2

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

D. none of these

Answer: B

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208. If $f(x) = A\sin\left(\frac{\pi x}{2}\right) + B, f'\left(\frac{1}{2}\right) = \sqrt{2}$ and $\int_0^1 f(x)dx = \frac{2A}{\pi}$ then constants A and B are

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

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

C. $0 - \frac{4}{\pi}$

D. $\frac{4}{\pi}, 0$

Answer: D

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209. $\int_{\pi/4}^{3\pi/4} \frac{dx}{1+\cos x} =$

A. 2

B. -2

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

D. $-\frac{1}{2}$

Answer: A

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MULTIPLE CHOICE QUESTIONS (PREVIOUS YEARS (MHT-CET EXAM QUESTIONS))

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

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

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

C. 0

D. 1

Answer: D

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2. Evaluate the following :

$$\int_{-\pi/2}^{\pi/2} \frac{\sin^4 x}{\sin^4 x + \cos^4 x} dx$$

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

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

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

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

Answer: A

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

A. 0

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

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

D. 1

Answer: B

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4. $\int_5^{10} \frac{dx}{(x-1)(x-2)} =$

A. $\log\left(\frac{32}{27}\right)$

B. $\log\left(\frac{27}{32}\right)$

C. $\log\left(\frac{2}{3}\right)$

D. $\log\left(\frac{4}{9}\right)$

Answer: A

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5. $\int_0^{\pi/2} \frac{\sin x - \cos x}{1 - \sin x \cdot \cos x} dx$ is equal to

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

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

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

D. 0

Answer: D

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6. If $\int_0^1 \tan^{-1} x \text{ dx} = p$, then the value of $\int_0^1 \tan^{-1}\left(\frac{1-x}{1+x}\right) \text{dx}$ is

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

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

C. $1 + p$

D. $1 - p$

Answer: B

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7. The value of $\int_0^{\pi/2} \log(\text{cosec}\ \ x)dx$ is

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

B. $\pi \log 2$

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

D. $2\pi \log 2$

Answer: A

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8. Evaluate the following :

$$\int_4^7 \frac{(11-x)^3}{x^3+(11-x)^3}dx$$

A. 1

B. $1/2$

C. $3/2$

D. 0

Answer: C

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9. $\int_{-\pi/2}^{\pi/2} \frac{\sin^{2n-1} x}{1+\cos^{2n} x} dx =$

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

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

C. 0

D. π

Answer: C

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10. If $\int_{-2}^{\lambda} (3x^2 + 2x + 4) dx = 32$ then $\lambda =$

A. 1

B. 2

C. 3

D. 4

Answer: B

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11. By the define integral as a limit of a sum $\int_0^2 e^x dx$ can be expressed as

A. $\lim_{n \to \infty} h\left[\frac{e^h\left(e^{nh}-1\right)}{e^h-1}\right]$

B. $\lim_{n \to \infty} h\left[\frac{e^h\left(e^{nh}+1\right)}{e^h+1}\right]$

C. $\lim_{n \to \infty} e^h \left[\frac{e^{nh} - 1}{e^h - 1} \right]$

D. $\lim_{n \to \infty} e^h \left[\frac{e^{nh} + 1}{e^h + 1} \right]$

Answer: A

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12. If $\int_a^b x^3 dx = 0, and \int_a^b x^2 dx = \frac{2}{3}$, find real values of a and find $a and b$.

A. -1 and 1

B. 2 and 3

C. 3 and 2

D. 1 and -1

Answer: A

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TEST YOUR GRASP

1. $\int_1^2 \frac{1}{x^2 - 2x + 2} dx =$

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

B. 0

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

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

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2. $\int_1^3 \frac{1}{x+x^2}dx =$

A. $\log\left(\frac{2}{3}\right)$

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

C. $\log\left(\frac{3}{2}\right)$

D. $\log_2 3$

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3. Evaluate : $(i)\int_0^{\pi/2}\cos^3 x dx\ (ii)\int_0^{\pi/2}\sin^4 x dx$

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

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

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

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

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4. $\int_1^{e^3} \frac{1}{x\sqrt{1+\log x}} dx =$

A. 1

B. 2

C. 3

D. 4

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5. $\int_0^1 x^3\sqrt{1-x^2}dx =$

A. $\frac{1}{15}$

B. $\frac{22}{15}$

C. $\frac{4}{15}$

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

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6. Let $I = \int_1^3 |(x-1)(x-2)(x-3)|dx$. The value of I^{-1}.

A. 0

B. 334

C. 57

D. 1

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7. Evaluate the following :

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

A. $\frac{4}{35}$

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

C. $\frac{35}{4}$

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

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

A. $2\log\left(1+\sqrt{2}\right)$

B. $2\log\left(e + \sqrt{1+e^2}\right)$

C. 0

D. $e(1-e)$

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

A. 224

B. 324

C. 432

D. 234

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10. $\int_{-5}^{5} \sqrt{25-x^2}dx =$

A. $\frac{25\pi}{2}$

B. 25π

C. 50π

D. 75π

Answer: A

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11. $\int_1^2 \frac{1}{x + x^3} dx =$

A. $\log\left(\frac{8}{5}\right)$

B. $\log\left(\frac{5}{8}\right)$

C. $\frac{1}{2}\log\left(\frac{8}{5}\right)$

D. $\frac{1}{2}\log\left(\frac{5}{8}\right)$

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

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

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

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

D. 0

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13. If $f(a+b-x) = f(x)$, then $\int_a^{b} xf(x)dx$ is equal to

A. $\frac{a-b}{2}.\int_a^{b} f(x)dx$

B. $\frac{a+b}{2}.\int_a^b f(x)dx$

C. $\frac{a-b}{2}.\int_a^b f(a-b+x)dx$

D. 0

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14. If $f(x)+f(2-x)=0$, then $\int_0^2 \frac{1}{1+2^{f(x)}}dx =$

A. 2

B. 1

C. f (2)

D. $\frac{1}{2}f(2)$

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15. If the graph of the function y = f(x) passes through the points (1, 2) and (3, 5), then $\int_1^3 f'(x)dx =$

A. -1

B. 2

C. -3

D. 0

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16. $\int_0^{\pi} \frac{\cos x}{x^2 + (\pi - x)^2} dx =$

A. 0

B. π

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

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

Answer: A

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

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

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

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

D. 1

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

A. log 2

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

C. 2 log 2

D. 4 log 2

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19. The value of $\int_0^1 \tan^{-1}\left(\frac{2x-1}{1+x-x^2}\right)dx$ is

A. 0

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

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

D. $\frac{\pi^2}{4}$

Answer: A

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20. If $I_1 = \int_0^{\pi/2} x.\sin x dx$ and $I_2 = \int_0^{\pi/2} x.\cos x dx$, then

A. $I_1 + I_2 = \frac{\pi}{2}$

B. $I_1 = \frac{\pi}{2} I_2$

C. $I_1 + I_2 = 0$

D. $I_1 = I_2$

Answer: A

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