MATHS

BOOKS - MHTCET PREVIOUS YEAR PAPERS AND PRACTICE PAPERS

DEFINITE INTEGRALS

Practice Exercise Exercise 1 Topical Problems

1. $\int_0^{\pi/2} \frac{\cos x}{1+\sin x} dx$ is equal to

A. log 2

B. 2 log 2

C. $(\log 2)^2$

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

Answer: A

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2. If $P = \int_0^{3\pi} f\left(\cos^2 x\right) dx$ and $Q = \int_0^{\pi} f\left(\cos^2 x\right) dx$, then

A. $P - Q = 0$

B. $P - 2Q = 0$

C. $P - 3Q = 0$

D. $P - 5Q = 0$

Answer: C

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3. The vlaue of the integral

$$\int_{-1}^{3}\left(\tan^{1}\frac{x}{x^2+1}+\tan^{-1}\frac{x^2+1}{x}\right)dx \text{ is equal to}$$

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

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

C. π

D. 2π

Answer: D

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4. The value of α, which satisfy $\int_{\frac{\pi}{2}}^{\alpha}\sin x dx=\sin 2\alpha(\alpha\in[0,2\pi]$ are equal

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

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

C. $\frac{7\pi}{6}$

D. All of these

Answer: D

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5. $\int_0^{\pi/2} \cos^2 x dx$ is equal to

A. 0

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

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

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

Answer: C

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6. $\int_{-1}^{1} \frac{dx}{x^2 + 2x + 5}$ is equal to

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

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

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

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

Answer: C

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7. $\int_0^{\pi/2} \frac{\sin^{3/2} x}{\sin^{3/2} x + \cos^{3/2} x} dx$ is equal to

A. 0

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

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

D. None of these

Answer: C

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8. The integral $\int_2^4 \frac{\log x^2}{\log x^2 + \log(36 - 12x + x^2)} dx$ is equal to:

(1) 2 (2) 4 (3) 1 (4) 6

A. 2

B. 4

C. 1

D. 6

Answer: C

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9. $\int_{-1}^{2} f(x)dx$ where $f(x) = |x+1| + |x| + |x-1|$ is equal to

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

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

C. $\frac{13}{2}$

D. $\frac{19}{2}$

Answer: D

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10. $\int_0^{\pi/2} \frac{\cos^5 x}{\sin^5 x + \cos^5 x} dx$ is equal to

A. 0

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

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

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

Answer: C

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11. $\int_0^4 |x-1|dx$ is equal to

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

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

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

D. 5

Answer: D

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12. $\int_{-1}^{1} \frac{x^3+|x|+1}{x^2+2|x|+1}dx$ is equal to

A. log 2

B. 2 log 2

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

D. $4\log 2$

Answer: B

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13. $\int_{-2}^{2}|x\cos\pi x|dx$ is equal to

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

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

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

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

Answer: A

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14. $\int_0^{\pi} \sqrt{\frac{\cos 2x + 1}{2}} dx$ is equal to

A. 0

B. 2

C. -2

D. None of these

Answer: B

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15. Given function $f(x) = \begin{cases} x^2 & \text{for } 0 \leq x < 1 \\ \sqrt{x} & \text{for } 1 \leq x \leq 2 \end{cases}$, then $\int_0^2 f(x)dx$ is equal to

A. $\left(4\sqrt{2} - 1\right)$

B. $\frac{1}{3}(4\sqrt{2}-1)$

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

D. None of these

Answer: B

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16. $\int_{-2}^{3}|x^2-1|dx$ is equal to

A. 3

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

C. $\frac{17}{3}$

D. $\frac{28}{3}$

Answer: D

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17. $\int_{-1}^{1} x^{17} \cos^4 x \, dx$ is equal to

A. $\frac{17}{4}$

B. $\frac{13}{2}$

C. 0

D. -1

Answer: C

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18. $\int_{0}^{\pi/2} \sin 2x \log(\tan x) \, dx$ is equal to

A. π

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

C. 0

D. 2π

Answer: C

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19. $\int_{-1}^{1} \log\left(x + \sqrt{x^2+1}\right)$ dx is equal to

A. 0

B. log 2

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

D. None of these

Answer: A

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20. For any integer n, the integral $\int_0^{\pi} e^{\cos^2 x} \cos^3(2n+1)x dx$ has the value

A. π

B. 1

C. 0

D. None of these

Answer: C

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21. $\int_a^b \frac{|x|}{x} dx, a < 0 < b,$ is equal to

A. $|b| - |a|$

B. $|b| + |a|$

C. $|a - b|$

D. None of these

Answer: A

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22. The value of integral $\int_{-1}^{1} \frac{|x+2|}{x+2} dx$ is

A. 1

B. 2

C. 0

D. -1

Answer: B

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23. Evaluate: $\int_{-1}^{4} f(x)dx = 4 and \int_{2}^{4} (3 - f(x))dx = 7,$ then find the value of $\int_{2}^{-1} f(x)dx.$

A. -2

B. 3

C. 4

D. 5

Answer: D

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24. $\int_2^k (2x+1)dx = 6$ then k is equal to

A. 4

B. -2

C. -3

D. 3

Answer: D

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25. The value of $\int_{-3}^{3} \left(ax + bx^3 + cx + k\right)dx$, where a,b,c,k are constants, depends only on. . . .

A. a and k

B. a and b

C. a, b and c

D. k

Answer: D

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26. $3a\int_0^1 \left(\frac{ax-1}{a-1}\right)^2 dx$ is equal to

A. $a-1+(a-1)^{-2}$

B. $a+a^{-2}$

C. $a-a^2$

D. $a^2+\frac{1}{a^2}$

Answer: A

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27. $\int_0^3 \left|x^3 + x^2 + 3x\right| dx$ is equal to

A. $\frac{171}{2}$

B. $\frac{171}{4}$

C. $\frac{170}{4}$

D. $\frac{170}{3}$

Answer: B

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28. If $b > a$, then $\int_a^b \frac{dx}{\sqrt{(x-a)(b-x)}}$ is equal to

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

B. π

C. $\frac{\pi}{2}(b-a)$

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

Answer: B

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29. The value of the integral $\int_0^{\pi/2} \left(\sin^{100} x - \cos^{100} x\right) dx$ is

A. $\frac{1}{100}$

B. $\frac{100!}{(100)^{100}}$

C. $\frac{\pi}{100}$

D. 0

Answer: D

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30. The value of $\int_0^{\infty} \frac{dx}{a^2 + x^2}$ is equal to

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

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

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

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

Answer: B

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31. $\int_{\pi/4}^{\pi/2} \text{cosec}^2 dx$ is equal to

A. -1

B. 1

C. 0

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

Answer: B

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32. If $\int_a^b x^3 dx = 0$ and if $\int_a^b x^2 dx = \frac{2}{3}$, then the values of a and b respectively are

A. 1,1

B. $-1, -1$

C. $1, -1$

D. $-1, 1$

Answer: D

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33. If $f(t)$ is an odd function, then $\varphi(x) = \int_a^x f(t)dx$ is an even function.

A. an odd function

B. an even function

C. neither even nor odd

D. 0

Answer: B

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

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

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

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

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

Answer: D

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35. $\int_{-1}^{1} |1-x|dx$ is equal to

A. -2

B. 0

C. 2

D. 4

Answer: C

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36. $\int_0^1 \frac{dx}{1+x+x^2}$ is equal to

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

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

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

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

Answer: D

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37. $\int_1^2 \left(\frac{1}{x} - \frac{1}{2x^2}\right) e^{2x}$ dx is equal to

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

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

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

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

Answer: A

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38. Let $f:(-1,1) \to R$ be continous function , if $\int_0^{\sin x} f(t)dt = \frac{\sqrt{3}}{2}x$, then $f\left(\frac{\sqrt{3}}{2}\right)$ is equal to

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

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

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

D. $\sqrt{3}$

Answer: D

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39. If $f(a+b-x)=f(x),$ then $\int_a^b xf(x)dx$ is equal to

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

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

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

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

Answer: D

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40. $\int_{-a}^{a} \sqrt{\frac{a-x}{a+x}} dx$ is equal to

A. π

B. a

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

D. $a\pi$

Answer: D

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41. $\int_{0}^{2\pi} (\sin x + |\sin x|) dx$ is equal to

A. 0

B. 4

C. 8

D. 1

Answer: B

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

A. $\frac{3}{64}$

B. $-\frac{3}{64}$

C. $\frac{-3}{64}$

D. $-\frac{1}{128}$

Answer: B

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43. $\int_0^1 xe^{x^2}dx$ is equal to

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

B. $e-1$

C. $\frac{1}{2}(e-1)$

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

Answer: C

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44. The value of $\int_1^4 |x-3|dx$ is equal to

A. 2

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

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

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

Answer: B

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45. $\int_0^1 \frac{dx}{e^x + e^{-x}} dx$ is equal to

A. $\pi/4$

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

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

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

Answer: B

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46. $\int_0^{\pi/4} \log\left(\frac{\sin x + \cos x}{\cos x}\right) dx$ is equal to

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

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

C. $\log 2$

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

Answer: A

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47. $\int_0^{2\pi} \cos^5 x dx$ is equal to

A. $\frac{7}{25}$

B. $\frac{3}{7}$

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

D. 0

Answer: D

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48. $\int_{-1}^{1} x^3 e^{x^4} dx$ is equal to

A. 0

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

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

D. 3

Answer: A

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49. 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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50. The value of the integral $\int_{-a}^{a} \frac{xe^{x^2}}{1+x^2}dx$ is

A. e^{a^2}

B. 0

C. e^{-a^2}

D. a

Answer: B

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51. If $f(x) = \begin{cases} e^{\cos x} \sin x & |x| \leq 2 \\ 2 & otherwise \end{cases}$ then $\int_{-2}^{3} f(x)dx =$ (A) 0 (B) 1 (C) 2 (D) 3

A. 0

B. 1

C. 2

D. 3

Answer: C

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

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

B. $\frac{\pi^2}{16}$

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

D. None of these

Answer: D

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53. If f(x) is defined on $[-2, 2]$ by $f(x) = 4x^2 - 3x + 1$ and $g(x) = \frac{f(-x) - f(x)}{x^2 + 3}$ then $\int_{-2}^{2} g(x)dx$ is equal to

A. 64

B. -48

C. 0

D. 24

Answer: C

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54. $\int_{0}^{\pi/2} \frac{2\sqrt{\cos\theta}}{3\left(\sqrt{\sin\theta} + \sqrt{\cos\theta}\right)} d\theta$ is equal to

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

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

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

D. None of these

Answer: A

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55. The value of $\int_{-\pi/2}^{\pi/2} \left(x^2 + x\cos x + \tan^5 x + 1\right) dx$ is equal to

A. 0

B. 2

C. π

D. None of these

Answer: C

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56. $\int_0^{\pi} \cos^3 x dx$ is equal to

A. 0

B. 1

C. -1

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

Answer: A

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57. $\int_0^{\pi} |\cos x| dx$ is equal to

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

B. -2

C. 1

D. 2

Answer: D

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58. $\int_{-10}^{10} \log\left(\frac{a+x}{a-x}\right) dx$ is equal to

A. 0

B. $-2\log(1+10)$

C. $2\log\left(\frac{a+10}{a-10}\right)$

D. $2\log(1+10)$

Answer: A

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59. $\int_{-\pi}^{\pi} \frac{\sin^4 x}{\sin^4 x + \cos^4 x} dx$ is equal to

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

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

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

D. π

Answer: D

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60. Value of the integral $\int_{-\pi/2}^{\pi/2} \cos x dx$ is

A. 4

B. 2

C. 0

D. 1

Answer: B

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61. The value of $l = \int_{-\pi/2}^{\pi/2} |\sin x| dx$ is

A. 0

B. 2

C. -2

D. $-2 < l < 2$

Answer: B

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62. If $\int_0^a f(2a-x)dx = m$ and $\int_0^a f(x)dx = n$, then $\int_0^{2a} f(x)dx$ is equal to

A. $2m+n$

B. $m+2n$

C. $m-n$

D. $m+n$

Answer: D

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63. The value of $\int_{-2}^{4} |x+1| dx$ is equal to

A. 12

B. 14

C. 13

D. 16

Answer: C

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64. $\int_{-\pi/2}^{\pi/2} \sin|x| dx$ is equal to

A. 0

B. 1

C. 2

D. π

Answer: C

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65. If $\int_0^{\pi} x f(\sin x)dx = A\int_0^{\pi/2} f(\sin x)dx,$ then A is equal to

A. 0

B. π

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

D. 2π

Answer: B

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66. The value of $\int_{-\pi/2}^{\pi/2} \log\left(\frac{2-\sin\theta}{2+\sin\theta}\right) d\theta$ is

A. 0

B. 1

C. 2

D. None of these

Answer: A

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67. The value of the integral $\int_0^2 |x^2 - 1| dx$ is

A. 0

B. 2

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

D. -2

Answer: B

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68. The value of $l = \int_0^1 \left| x - \frac{1}{2} \right| dx$ is

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

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

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

D. 2

Answer: B

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69. The value of integral $\int_0^{\pi} x f(\sin x) dx$ is

A. 0

B. $\pi \int_0^{\pi/2} f(\sin x) dx$

C. $\frac{\pi}{4} \int_0^{\pi} f(\sin x) dx$

D. None of these

Answer: B

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70. To find the numberical value of $\int_{-2}^{2}(px^3+qx+8)dx$ it is necessary to know the values of teh constants:

A. p

B. q

C. s

D. p and s

Answer: C

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71. The value of $\int_{-\pi}^{\pi}\frac{\cos^2 x}{1+a^2}dx, a>0,$ is

A. 2π

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

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

D. $a\pi$

Answer: C

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72. The value of $\int_0^{\pi/2} \frac{\sin^2 x - \cos^2 x}{\sin^3 x + \cos^3 x} dx$ is

A. 0

B. 1

C. 2

D. 3

Answer: A

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73. If $f(x)$ is a function satisfying $f\left(\frac{1}{x}\right) + x^2 f(x) = 0$ for all nonzero x , then evaluate $\int_{\sin\theta}^{\cos ec\theta} f(x)dx$

A. 0

B. 1

C. 2

D. 3

Answer: A

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74. If a function f(x) satisfies $f'(x) = g(x)$. Then, the value of $\int_a^b f(x)g(x)dx$ is

A. $\frac{1}{2}\left[(f(b))^2 - (f(a))^2\right]$

B. $\frac{1}{2}\left[(f(b))^2 + (f(a))^2\right]$

C. $\frac{1}{2}[f(b) - f(a)]^2$

D. None of these

Answer: A

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75. $\int_0^{\pi} \frac{1}{1+\sin x}dx$ is equal to

A. 1

B. 2

C. -1

D. -2

Answer: B

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76. The value of $\int_0^{\infty} \frac{dx}{(x^2+4)(x^2+9)}$ is

A. $\frac{\pi}{60}$

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

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

D. $\frac{\pi}{80}$

Answer: A

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77. $\int_0^1 \frac{1}{x+\sqrt{x}}$ is equal to

A. $\log 3$

B. $\log 1$

C. $\log 4$

D. $\log 2$

Answer: C

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78. $\int_0^2 \frac{x^3 dx}{(x^2+1)^{3/2}}$ is equal to

A. $\left(\sqrt{2}-1\right)^2$

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

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

D. None of these

Answer: D

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79. The value of $\int_0^a \sqrt{\frac{a-x}{x}}$ dx is

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

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

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

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

Answer: C

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80. The value of integral $\int_0^1 \sqrt{\frac{1-x}{1+x}}dx$ is

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

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

C. -1

D. 1

Answer: B

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81. The value of $\int_2^3 \frac{x+1}{x^2(x-1)}dx$ is

A. $\log. \frac{16}{9} + \frac{1}{6}$

B. $\log. \frac{16}{9} - \frac{1}{6}$

C. $2\log 2 - \frac{1}{6}$

D. $\log. \frac{4}{3} - \frac{1}{6}$

Answer: B

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82. The value of $\int_1^4 e^{\sqrt{x}}\, dx$ is

A. e^2

B. $2e^2$

C. $4e^2$

D. $3e^2$

Answer: B

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83. The value of $\int_1^2 \frac{dx}{x(1+x^4)}$ is

A. $\frac{1}{4}\log.\ \frac{17}{32}$

B. $\frac{1}{4}\log.\ \frac{32}{17}$

C. $\log.\ \frac{17}{2}$

D. $\frac{1}{4}\log.\ \frac{17}{2}$

Answer: B

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84. $\int_0^{\pi/2} x \sin x dx$ is equal to

A. 0

B. 1

C. -1

D. 2

Answer: B

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85. $\int_{-1}^{1} \sin^3 x \cos^2 x \, dx$ is equal to

A. -1

B. 1

C. 0

D. None of these

Answer: C

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86. The value of $\int_1^{e^2} \frac{dx}{x(1+\log x)^2}$ is

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

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

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

D. $\ln 2$

Answer: A

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87. $\int_0^2 \frac{2x-2}{2x-x^2}$dx is equal to

A. 0

B. 2

C. 3

D. 4

Answer: A

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88. $\int_1^x \frac{\log(x^2)}{x}$ dx is equal to

A. $(\log x)^2$

B. $\frac{1}{2}(\log x)^2$

C. $\frac{\log x^2}{2}$

D. None of these

Answer: A

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89. $\int_0^{\pi/6} \frac{\sin x}{\cos^3 x} dx$ is equal to

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

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

C. 2

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

Answer: B

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90. $\int_0^{\lambda} \frac{ydy}{\sqrt{y+\lambda}}$ is equal to

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

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

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

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

Answer: A

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91. The value of the integral $l = \int_0^1 x(1-x)^n dx$ is

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

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

C. $\frac{1}{n+1}-\frac{1}{n+2}$

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

Answer: C

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92. $\int_8^{15}\frac{dx}{(x-3)\sqrt{x+1}}$ is equal to

A. $\frac{1}{2}\log.\frac{5}{3}$

B. $\frac{1}{3}\log.\frac{5}{3}$

C. $\frac{1}{5}\log.\frac{3}{5}$

D. $\frac{1}{2}\log.\frac{3}{5}$

Answer: A

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93. The value of $\int_0^{\pi} \left|\sin^3\theta\right| d\theta$ is

A. 0

B. π

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

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

Answer: C

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

A. $\pi + 2$

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

C. $\pi + 1$

D. π

Answer: A

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95. $\int_0^{\pi/2} \frac{\cos x}{(1+\sin x)(2+\sin x)} dx$ is equal to

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

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

C. $\log. \frac{3}{4}$

D. None of these

Answer: A

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96. $\int_0^{\pi/2} \frac{\cos\theta}{\sqrt{4-\sin^2\theta}} d\theta$ is equal to

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

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

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

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

Answer: B

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97. The value of the integral $\int_0^{\pi/4} \sin^{-4} x dx$, is

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

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

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

D. None of these

Answer: A

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98. If $f(x) = \int_0^x t \sin t dt$, then f'(x) is

A. $\sin x + x \sin x$

B. $x \sin x$

C. $x \cos x$

D. $\sin x + x \cos x$

Answer: B

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99. Let f and g be continuous functions on [0 , a] such that $f(x) = f(x) = f(a - x)$ and $g(x) + g(a - x) = 4$, then $\int_0^a f(x)g(x)$dx is equal to

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

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

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

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

Answer: B

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100. $If x = \int_0^y \frac{dt}{\sqrt{1+9t^2}} and \frac{d^2y}{dx^2} = ay, then f \in da$

A. 3

B. 6

C. 9

D. 1

Answer: C

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101. $\int_0^1 x^{3/2}\sqrt{1-x}dx$ is equal to

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

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

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

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

Answer: D

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102. If $\int_{\log 2}^{x} \frac{du}{(e^u-1)^{1/2}} = \frac{\pi}{6}$, then e^x is equal to

A. 1

B. 2

C. 4

D. -1

Answer: C

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103. If $\int_0^a f(2a-x)dx = m$ and $\int_0^a f(x)dx = n,$ then $\int_0^{2a} f(x)dx$ is equal to

A. $2\lambda - \mu$

B. $\lambda + \mu$

C. $\mu - \lambda$

D. $\lambda - 2\mu$

Answer: B

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104. $\int_{-\pi}^{\pi} \frac{2x(1+\sin x)}{1+\cos^2} dx$ is

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

B. π^2

C. zero

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

Answer: B

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105. $\int_0^{\pi/6} \frac{\sin x}{\cos^3 x}$ dx is

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

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

C. 2

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

Answer: B

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106. $\int_1^x \frac{\log x^2}{x} dx$ is equal to

A. $(\log x)^2$

B. $\frac{1}{2}(\log x)^2$

C. $\frac{\log x^2}{2}$

D. None of these

Answer: A

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107. $\int_0^{\pi/8} \frac{\sec^2 2x}{2} dx$ is equal to

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

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

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

D. None of these

Answer: A

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108. if $\int_0^k \frac{dx}{2+8x^2} = \frac{\pi}{16}$ then find the value of k

A. 1

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

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

D. None of these

Answer: B

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

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

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

C. $\frac{8\sqrt{2}}{3}$

D. None of these

Answer: B

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110. The value of the integral $\int_0^{\log 5} \frac{e^x\sqrt{e^x-1}}{e^x+3}dx$

A. $3+2\pi$

B. $4-\pi$

C. $2+\pi$

D. None of these

Answer: B

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111. The value of $\int_0^2 \frac{3\sqrt{x}}{\sqrt{x}}$ dx is

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

B. 0

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

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

Answer: A

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112. $\int_0^a \frac{xdx}{\sqrt{a^2+x^2}}$ is equal to

A. $a\left(\sqrt{2}-1\right)$

B. $a\left(1-\sqrt{2}\right)$

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

D. $2a\sqrt{3}$

Answer: A

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113. $\int_0^{\pi/4} \sec^7\theta \sin^3\theta d\theta$ is equal to

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

B. $\frac{3}{12}$

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

D. None of these

Answer: C

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114. $\int_{-1}^{0} \frac{dx}{x^2+2x+2}$ is equal to

A. 0

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

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

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

Answer: B

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115. $\int_{0}^{x} \frac{dx}{1-2a\cos x+a^2}$ is equal to

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

B. $\pi\left(1-a^2\right)$

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

D. None of these

Answer: C

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116. $\int_0^{\pi/2} \sec x \log(\sec x + \tan x) dx$ is equal to

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

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

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

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

Answer: A

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117. The correct evalution of $\int_0^{\pi/2} \sin x \sin 2x dx$ is

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

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

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

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

Answer: D

Watch Video Solution

118. $\int_0^a \frac{x^4 dx}{(a^2+x^2)^4}$ is equal to

A. $\frac{1}{16a^3}\left(\frac{\pi}{4}-\frac{1}{3}\right)$

B. $\frac{1}{16a^3}\left(\frac{\pi}{4}+\frac{1}{3}\right)$

C. $\frac{1}{16}a^3\left(\frac{\pi}{4}-\frac{1}{3}\right)$

D. $\frac{1}{16}a^3\left(\frac{\pi}{4}+\frac{1}{3}\right)$

Answer: A

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119. $\int_3^8 \frac{2-3x}{x\sqrt{1+x}}dx$ is equal to

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

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

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

D. None of these

Answer: A

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120. $\int_0^{\pi/6} (2+3x^2)\cos 3x dx$ is equal to

A. $\frac{1}{36}(\pi+16)$

B. $\frac{1}{36}(\pi-16)$

C. $\frac{1}{36}(\pi^2-16)$

D. $\frac{1}{36}(\pi^2+16)$

Answer: D

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121. $\int_0^{\frac{\pi}{4}} \frac{\sec x}{1+2\sin^2 x}$ is equal to

A. $\frac{1}{3}\left[\log\left(\sqrt{2}+1\right)+\frac{\pi}{2\sqrt{2}}\right]$

B. $\frac{1}{3}\left[\log\left(\sqrt{2}+1\right)-\frac{\pi}{2\sqrt{2}}\right]$

C. $3\left[\log\left(\sqrt{2}+1\right)-\frac{\pi}{2\sqrt{2}}\right]$

D. $3\left[\log\left(\sqrt{2}+1\right)+\frac{\pi}{2\sqrt{2}}\right]$

Answer: A

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122. $\int_0^{\pi/4}\frac{\sec^2 x}{(1+\tan x)(2+\tan x)}dx$ is equal to

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

B. $\log_e 3$

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

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

Answer: D

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123. $\int_{-\pi/4}^{-\pi/4} e^{-x} \sin x \quad dx$ is

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

B. $-\frac{\sqrt{2}}{2}e^{\frac{-\pi}{4}}$

C. $-\sqrt{2}\left(e^{\frac{-\pi}{4}}+e^{\frac{-\pi}{4}}\right)$

D. 0

Answer: A

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124. $\int_0^{\pi/2} \frac{\sin x \cos x dx}{\cos^2 x + 3\cos x + 2}$ is equal to

A. $\log. \left(\frac{8}{9}\right)$

B. $\log. \left(\frac{9}{8}\right)$

C. $\log(8 \times 9)$

D. None of these

Answer: B

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125. The value of $\int_0^1 \frac{x^4 + 1}{x^2 + 1} dx$ is

A. $\frac{1}{6}(3\pi - 4)$

B. $\frac{1}{6}(3 - 4\pi)$

C. $\frac{1}{6}(3\pi + 4)$

D. $\frac{1}{6}(3 + 4\pi)$

Answer: A

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126. Show that $(\lim)_{n\overrightarrow{\infty}}\left(\frac{1}{n+1} + \frac{1}{n+2} + + \frac{1}{6n}\right) = \log 6$

A. log 2

B. log3

C. log5

D. log 2

Answer: D

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127. $\lim_{n \to \infty} \frac{1}{n}\left[\frac{1}{n+1} + \frac{2}{n+2} + \ldots + \frac{3n}{4n}\right]$

A. log4

B. $-\log 4$

C. $1 - \log 4$

D. None of these

Answer: D

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128. $\lim_{n \to \infty} \frac{1}{2} \sum_{r=+1}^{2n} \frac{r}{\sqrt{n^2 + r^2}}$ equals

A. $1 + \sqrt{5}$

B. $-1+\sqrt{5}$

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

D. $1+\sqrt{2}$

Answer: B

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129. $\lim_{n\to\infty}\left(\frac{1}{n^2+1^2}+\frac{1}{n^2+2^2}+\ldots\frac{1}{2n^2}\right)$ equals

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

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

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

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

Answer: B

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130. $li \sum_{n->\infty} \sum_{r=1}^{n} \frac{1}{\sqrt{4n^2 - r^2}}$

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

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

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

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

Answer: A

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Practice Exercise Exercise 2 Miscellaneous Problems

1. The value of $\int_0^{\pi/2} x^{10} \sin x \ \ \mathrm{dx}$, is then the value of $\mu_{10} + 90\mu_8$, is

A. $10\left(\frac{\pi}{2}\right)^3$

B. $10\left(\frac{\pi}{2}\right)^9$

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

D. 0

Answer: B

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2.

$If \int_0^1 \cot^{-1}\left(1 - x + x^2\right) dx = \lambda \int_0^1 \tan^{-1} x dx, then \lambda is equa < o$

1 (b) 2 (c) 3 (d) 4

A. $\pi - \log 2$

B. $\pi + \log 2$

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

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

Answer: D

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3. The value of the integral $\int_3^6 \frac{\sqrt{x}}{\sqrt{9-x}+\sqrt{x}} dx$ is

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

B. 2

C. 1

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

Answer: A

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4. $\int_{-1}^{1} \frac{17x^5 - x^4 + 29x^3 - 31x + 1}{x^2 + 1} dx$ is equal to (A) $\frac{4}{5}$ (B) $\frac{5}{4}$ (C) $\frac{4}{3}$ (D) $\frac{3}{4}$

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

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

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

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

Answer: C

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5. The value of $\int_0^{\pi/2} \frac{2^{\sin x}}{2^{\sin x}+2^{\cos x}}dx$ is

A. 2

B. π

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

D. 2π

Answer: C

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

A. $\frac{\pi}{8}\log_e 2$

B. $\frac{\pi}{4}\log_2 e$

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

D. $\frac{\pi}{8}\log_e\left(\frac{1}{2}\right)$

Answer: A

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7. The value of the integral $\int_a^b \frac{\sqrt{x}dx}{\sqrt{x}+\sqrt{1+b-x}}$ is

A. π

B. $\frac{1}{2}(b-a)$

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

D. $b-a$

Answer: B

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8. $\int_0^{\pi/2} \frac{\cos x - \sin x}{1 + \cos x \sin x} dx$ is equal to

A. 0

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

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

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

Answer: A

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9. Evaluate: $(\lim)_{n \to \infty} \left[\frac{1}{n^2} \frac{\sec^2 1}{n^2} + 2/n^2 \frac{\sec^2 4}{n^2} + + \frac{1}{n} \sec^2 1 \right]$

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

B. tan 1

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

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

Answer: A

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10. The value of the integral $\int_0^{\pi/2} \log|\tan x| dx$ is

A. $\pi \log 2$

B. 0

C. $-\pi \log 2$

D. None of these

Answer: B

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11. $\int_{-\pi/2}^{\pi/2} \sin^4 x \cos^6 x dx$ is equal to

A. $\frac{3\pi}{64}$

B. $\frac{3\pi}{572}$

C. $\frac{3\pi}{256}$

D. $\frac{3\pi}{128}$

Answer: C

Watch Video Solution

12. If f(x) = $f(a+x)$ and $\int_0^a f(x)dx = k$, then $\int_0^{na} f(x)$ dx is equal to

A. nk

B. $(n-1)k$

C. $(n+1)k$

D. 0

Answer: A

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13. The value of $\int_0^{\sqrt{2}} \left[x^2\right] dx$ where $[\cdot]$ is the greatest integer function

A. $2-\sqrt{2}$

B. $2+\sqrt{2}$

C. $\sqrt{2}-1$

D. $\sqrt{2}-1$

Answer: C

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14. $\int_0^{\pi} \frac{xdx}{a^2\cos^2 x + b^2 \sin^2 x}$

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

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

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

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

Answer: C

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15. $l = \int_{-2}^{1} \left(\tan^{-1} x + \cot^{-1} \frac{1}{x} \right) dx$ is equal to

A. $\frac{5\pi}{2} + 4\tan^{-1} 2 - In\frac{5}{2}$

B. $\frac{5\pi}{2} - 4\tan^{-1} 2 + In\frac{5}{2}$

C. $\frac{5\pi}{2} - 3\tan^{-1} 2 - In\frac{5}{2}$

D. $\frac{5\pi}{2} - 3\tan^{-1} 2 + \frac{5}{2}$

Answer: B

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16. $\int_{0}^{\pi} x \sin^4 x dx$ is equal to

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

B. $\frac{3\pi^2}{16}$

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

D. $\frac{16\pi^2}{3}$

Answer: B

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17. If $\int_0^{\pi/2} \sin^6 dx = \frac{5\pi}{32}$, then the value of $\int_{-\pi}^{\pi} \left(\sin^6 x + \cos^6 x\right) dx$ is

A. $\frac{5\pi}{8}$

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

C. $\frac{5\pi}{2}$

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

Answer: D

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18. $\int_0^{\pi/4} \left[\sqrt{\tan x} + \sqrt{\cot x}\right] dx$ is equal to

A. $\sqrt{2}\pi$

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

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

D. 2π

Answer: C

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19. Evaluate the following limit:

$$\lim_{n \to \infty} \left[\frac{n!}{n^n}\right]^{1/n}$$

A. e

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

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

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

Answer: B

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20. 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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21. The value of integral $\sum_{k=1}^{n} \int_{0}^{1} f(k-1+x)dx$ is

A. $\int_{0}^{1} (x)dx$

B. $\int_{0}^{2} f(x)dx$

C. $\int_{0}^{n} f(x)dx$

D. $n\int_{0}^{1} f(x)dx$

Answer: C

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22. $If \int_{\sin x}^{1} t^2 f(t)dt = 1 = 1 - s \in x, wherex \in \left(0, \frac{\pi}{2}\right)$, then find the value of $f\left(\frac{1}{\sqrt{3}}\right)$.

A. 3

B. $\sqrt{3}$

C. $1/3$

D. None of these

Answer: A

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23. The value of $\int_{2}^{4} \{|x-2| + |x-3|\}dx$ is

A. 1

B. 2

C. 3

D. 5

Answer: C

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24. $\int_{-1}^{2} |x|^3 dx$ is equal to

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

B. $\frac{17}{4}$

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

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

Answer: B

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

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

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

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

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

Answer: A

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26. $\int_0^{\pi/4} \frac{4\sin 2\theta d\theta}{\sin^4\theta + \cos^4\theta} =$

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

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

C. π

D. None of these

Answer: C

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27. The value of the integral $\int_{-a}^{a} \frac{xe^{x^2}}{1+x^2} dx$ is

A. e^{ax}

B. 0

C. e^{-a^2}

D. a

Answer: B

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28. $\int_{-\pi/2}^{\pi/2} \frac{dx}{1+\cos x}$ is equal to

A. 0

B. 1

C. 2

D. 3

Answer: C

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29. The value of $\int_0^{12a} \frac{f(x)}{f(x)+f(12a-x)} dx$ is

A. a

B. 2a

C. 3a

D. 6a

Answer: D

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30. If $k\int_0^1 xf(3x)dx = \int_0^3 tf(t)dt$, then the value of k is

A. 9

B. 3

C. $\frac{1}{9}$

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

Answer: A

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31. $\lim_{n \to \infty} + \frac{1}{\sqrt{n^2+n}} + \frac{1}{\sqrt{n^2+2n}} + \ldots \frac{1}{\sqrt{n^2+(n-1)n}}$ is equal to

A. $2+2\sqrt{2}$

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

C. $2\sqrt{2}$

D. 2

Answer: B

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32. $\lim_{n \to \infty} \frac{1^p + 2^p + 3^p + \ldots\ldots\ldots + n^p}{n^{p+1}}$

A. $\frac{1}{p+1}$

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

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

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

Answer: A

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33. Evaluate:

$(\lim)_{n \to \infty} \left(\frac{1}{\sqrt{4n^2 - 1}} + \frac{1}{\sqrt{4n^2 - 2^2}} + + \frac{1}{\sqrt{3n^2}} \right)$

A. 0

B. 1

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

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

Answer: D

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34. If $f(x) = \tan x - \tan^3 x + \tan^5 x - \tan^7 x + \ldots\infty$ for $o < x < \frac{\pi}{4}$, than $\int_0^{\pi/4} f(x)dx =$

A. 1

B. 0

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

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

Answer: C

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35. The value of $\int_0^{\frac{\pi}{8}} \cos^3 4\theta d\theta$ is equal to -

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

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

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

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

Answer: D

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36. $\int_0^{\pi/3} \frac{\cos x + \sin x}{\sqrt{1+\sin 2x}} dx$ is equal to

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

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

C. π

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

Answer: D

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37. $\int_0^1 x^{3/2}\sqrt{1-x}dx$ is equal to

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

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

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

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

Answer: D

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38. The value of $\int_1^2 \frac{dx}{(x+1)\sqrt{(x^2)-1}}$ is

A. 1

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

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

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

Answer: B

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39. If $f(x) = \begin{vmatrix} \sin x + \sin x 2x + \sin 3x & \sin 2x & \sin 3x \\ 3 + 4\sin x & 3 & 4\sin x \\ 1 + \sin x & \sin x & 1 \end{vmatrix}$, then the value of $\int_0^{\frac{\pi}{2}} f(x)dx$ is

A. 3

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

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

D. 0

Answer: C

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40. $\int_{-1}^{1} \left(e^{x^3} + e^{-x^3}\right)\left(e^x - e^{-x}\right)dx$ is equal to

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

B. $e^2 - 2e$

C. $(e^2 - 2e)$

D. 0

Answer: D

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41. $\lim_{n \to \infty} \left(\frac{1}{n} + \frac{1}{n+1} + \ldots + \frac{1}{3n} \right)$ is equal to

A. log 2

B. log3

C. log5

D. 0

Answer: B

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42. Let $f(x) = x - [x]$, for every real number x, where $[x]$ is the greatest integer less than or equal to x. Then, evaluate $\int_{-1}^{1} f(x)dx$.

A. 1

B. 2

C. 3

D. 0

Answer: A

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43. The value of $\int_0^1 \frac{x^4+1}{x^2+1}dx$ is

A. $\frac{1}{6}(3-4\pi)$

B. $\frac{1}{6}(3\pi+4)$

C. $\frac{1}{6}(3+4\pi)$

D. $\frac{1}{6}(3\pi-4)$

Answer: D

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44. The value of $\int_3^5 \frac{x^2}{x^2-4}$dx, is

A. $2-\log_e\left(\frac{15}{7}\right)$

B. $2+\log_e\left(\frac{15}{7}\right)$

C. $2 + 4\log_e 3 - 4\log_e 7 + 4\log_e 5$

D. $2 - \tan^{-1}\left(\frac{15}{7}\right)$

Answer: B

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45. The value of $\int_0^{\pi/2} \frac{(\sin x + \cos x)^2}{\sqrt{1 + \sin 2x}} dx$ is

A. 0

B. 1

C. 2

D. 3

Answer: C

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46. $\int_0^a \sqrt{a^2 - x^2}\, dx$ is equal to

A. πa^2

B. $\frac{1}{2}\pi a^2$

C. $\frac{1}{3}\pi a^2$

D. $\frac{1}{4}\pi a^2$

Answer: D

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47. The value of $\int_{e^{-1}}^{e} \frac{dt}{t(t+1)}$ is equal to

A. 1

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

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

D. $\log(1+e)$

Answer: A

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48. The value of $\int_1^e 10^{\log_e x}\,dx$ is equal to

A. $10\log_e(10e)$

B. $\frac{10e-1}{\log_e 10e}$

C. $\frac{10e}{\log_e 10e}$

D. $(10e)\log_e(10e)$

Answer: B

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49. If $\int_2^e \left(\frac{1}{\log x} - \frac{1}{(\log x)^2}\right) dx = a + \frac{b}{\log 2}$, then

A. $a = e, b = -2$

B. $a = e, b = 2$

C. $a = -e, b = 2$

D. None of these

Answer: A

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50. $\int_0^\infty \frac{dx}{\left(x + \sqrt{x^2+1}\right)^3}$ is equal to

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

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

C. $\frac{-3}{8}$

D. None of these

Answer: A

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51. The value of the integral $\int_{-\pi/2}^{\pi/2} \sqrt{\cos x - \cos^3 x}\, dx$ is

A. 0

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

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

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

Answer: B

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52. The value of

$$I = \int_{-2}^{0} \{x^3 + 3x^2 + 3x + 3 + (x+1)\cos(x+1)\cos(x+1)\}dx$$

, is

A. 0

B. 3

C. 4

D. 1

Answer: C

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53. $\int_{\alpha}^{\beta} \sqrt{\frac{x-\alpha}{\beta-x}}$ dx is equal to

A. $\frac{\pi}{2}(\alpha-\beta)$

B. $\frac{\pi}{2}(\beta-\alpha)$

C. $\pi(\alpha-\beta)$

D. $\pi(\beta-\alpha)$

Answer: B

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54. Let f(x) be a function satisfying $f'(x) = f(x)$ with $f(0) = 1$ and g(x) be a function that satisfies $f(x) + g(x) = x^2$. Then the value of the integral $\int_0^1 f(x)g(x)dx$, is

A. $\text{lee} - \frac{e^2}{2} - \frac{5}{2}$

B. $e + \frac{e^2}{2} - \frac{3}{2}$

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

D. $e + \frac{e^2}{2} + \frac{5}{2}$

Answer: C

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55. The value

$$\int_{-2}^{2} \left\{ p \ \text{In}\left(\frac{1+x}{1-x}\right) + q \ \text{In} \ \left(\frac{1-x}{1+x}\right) - 2 + r \right\} dx$$ depends on the value of

A. the value of p

B. the value of q

C. the value of r

D. The values of p and q

Answer: C

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56. Let $F(x) = f(x) + f\left(\frac{1}{x}\right)$, where $f(x) = \int_1^x \frac{\log t}{1+t} dt$.

Then F (e) equals

A. $1/2$

B. 0

C. 1

D. 2

Answer: A

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57. If $2f(x) - 3f(1/x) = x, \quad \text{then} \int_1^2 f(x)dx$ is equal to

A. $(3/5)\log 2$

B. $(-3/5)(1+\log 2)$

C. $(-3/5)\log 2$

D. None of these

Answer: B

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58. $\int_0^{2\pi} \sin^6 x \cos^5 x dx$ is equal to

A. 2π

B. $\pi / 2$

C. 0

D. $-\pi$

Answer: C

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59. $\int_{-3\pi/2}^{-\pi/2} \left[(x+\pi)^3 + \cos^2 x\right] dx$ is equalt to

A. $\left(\frac{\pi^4}{32}\right) + \left(\frac{\pi}{2}\right)$

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

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

D. $\frac{\pi^4}{32}$

Answer: B

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

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

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

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

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

Answer: A

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61. $\lim_{n\to\infty} \sum_{r=1}^{n} \frac{1}{n} e^{r/n}$ is

A. e

B. $e-1$

C. $1-e$

D. $e+1$

Answer: B

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62. $\int_{-1/2}^{1/2} \cos x \log\left(\frac{1+x}{1-x}\right) dx = k \log 2,$ then k equals

A. 0

B. -1

C. -2

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

Answer: A

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63. The value of the integral $\int_0^{\pi/2} \sin^5 x dx$ is

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

B. $\frac{8}{5}$

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

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

Answer: C

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64. If $\int_0^{x^2} f(t)dt = x\cos\pi x$, then the value of f(4) is

A. 1

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

C. -1

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

Answer: B

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65. If $f(x)$ is differentiable and $\int_0^{t^2} xf(x)dx = \frac{2}{5}t^5$, then $f\left(\frac{4}{25}\right)$ equals $\frac{2}{5}$ (b) $-\frac{5}{2}$ 1 (d) $\frac{5}{2}$

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

B. $-\frac{5}{2}$

C. 1

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

Answer: D

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66. The value of $\int_0^{\pi/2} \sin^8 x dx$ is

A. $\frac{105\pi}{32(4!)}$

B. $\frac{105\pi}{14(4!)}$

C. $\frac{105}{16\pi(4!)}$

D. None of these

Answer: A

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67. The value of $\int_{-\pi}^{\pi} (1-x^2)\sin x \cos^2 x \quad dx$, is

A. 0

B. $\pi - \frac{p^3}{3}$

C. $2\pi - \pi^3$

D. $\frac{7}{2} - 2\pi^3$

Answer: A

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68. $\int_0^1 \frac{xdx}{\left[x+\sqrt{1-x^2}\right]\sqrt{1-x^2}}$ is equal to

A. 0

B. 1

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

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

Answer: C

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69. The value of $\int_0^{\pi} \left(\Sigma_{r=0}^{3} a_r \cos^{3-r} x \sin^r x\right) dx$ depends upon

A. a_1 and a_2

B. a_0 and a_3

C. a_2 and a_3

D. a_1 and a_3

Answer: D

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70. The value of $\int_{-1}^{1} x|x|dx$ is

A. 2

B. 1

C. 0

D. None of these

Answer: C

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71. The value of integral $\int_{1/\pi}^{2/\pi} \frac{\sin\left(\frac{1}{x}\right)}{x^2} dx =$

A. 2

B. -1

C. 0

D. 1

Answer: D

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72. The value of $\int_1^{e^2} \frac{dx}{x(1+\log x)^2}$ is

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

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

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

D. log 2

Answer: A

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

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

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

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

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

Answer: B

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74. The value of the integral $\int_0^1 x(1-x)^n dx$, is

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

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

C. $\frac{1}{n+2} - \frac{1}{n+2}$

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

Answer: C

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75. The value of $\int_0^{\pi} \frac{dx}{5+4\cos x}$ is

A. 2π

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

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

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

Answer: D

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76. The integral $\int_0^1 \frac{dx}{1-x+x^2}$ has the value

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

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

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

D. None of these

Answer: C

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Mht Cet Corner

1. $\int_{-\frac{\pi}{2}}^{\frac{\pi}{2}} \log\left(\frac{2-\sin x}{2+\sin x}\right) dx$ is equal to

A. 1

B. 3

C. 2

D. 0

Answer: D

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2. $\int_0^{\pi/2} \left(\frac{\sqrt[n]{\sec x}}{\sqrt[n]{\sec x} + \sqrt[n]{\operatorname{cosec} x}} \right) dx =$

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

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

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

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

Answer: C

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3. The value of $\int_0^1 x^2 \left(1 - x^2\right)^{3/2} dx$ is

A. $\frac{1}{32}$

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

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

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

Answer: D

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4. The value of $\int_0^{\infty} \frac{x}{(1+x)(x^2+1)} dx$ is

A. 2π

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

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

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

Answer: B

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5. Evaluate $\int_0^{\pi} \frac{xdx}{1+\cos\alpha\sin x}$,where $0<\alpha<\pi$.

A. $\frac{\pi\alpha}{\sin\alpha}$

B. $\frac{\pi\alpha}{\cos\alpha}$

C. $\frac{\pi\alpha}{1+\sin\alpha}$

D. $\frac{\pi\alpha}{1+\cos\alpha}$

Answer: A

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6. $\int_{\pi/2}^{\pi/2} \frac{\cos x}{1+e^x}dx$ is equal to

A. 1

B. 0

C. -1

D. None of these

Answer: A

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

A. π

B. $\pi/2$

C. $\pi/3$

D. $\pi/4$

Answer: D

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8. If $\int_0^1 \tan^{-1} x \, dx = p$, then the value of $\int_0^1 \tan^{-1}\left(\frac{1-x}{1+x}\right) dx$ is

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

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

C. $1 + p$

D. $1 - p$

Answer: B

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9. 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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10. Which of the following is true ?

A. $\int_0^1 e^x dx = e$

B. $\int_0^1 2^x dx = \log 2$

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

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

Answer: C

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11. $\int_0^5 \frac{1}{(x-1)(x-2)}dx$ is equal to

A. $\log. \frac{27}{32}$

B. $\log. \frac{32}{27}$

C. $\log. \frac{8}{9}$

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

Answer: B

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12. $\int_{\frac{\pi}{4}}^{\frac{\pi}{2}} e^x(\log \sin x + \cot x)dx$

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

B. $-e^{\pi/4}\log 2$

C. $\frac{1}{2}e^{\pi/4}\log 2$

D. $-\frac{1}{2}e^{\pi/4}\log 2$

Answer: C

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13. The value of $\int_0^{\pi} x\sin^3 x dx$ is

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

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

C. 0

D. None of these

Answer: B

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14. The value of $\int_0^{\frac{\pi}{2}} \frac{\cos 3x + 1}{\cos x - 1} dx$ is equal to

A. 2

B. 1

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

D. 0

Answer: B

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15. The value of $\int_0^1 \tan^{-1}\left(\frac{2x-1}{1+x-x^2}\right)dx$ is

A. 1

B. 0

C. -1

D. None of these

Answer: B

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16. If f is a continous function, then

A. $\int_{-2}^{2} f(x)dx = \int_0^2 [f(x) - f(-x)]dx$

B. $\int_{-3}^{5} 2f(x)dx = \int_{-6}^{10} f(x-1)dx$

C. $\int_{-3}^{5} f(x)dx = \int_{-4}^{4} f(x-1)dx$

D. $\int_{-3}^{5} f(x)dx = \int_{-2}^{6} f(x-1)dx$

Answer: B

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

A. 1

B. 2

C. 3

D. 0

Answer: D

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18. The value of $\int_{-1}^{1} \log\left(\frac{x-1}{x+1}\right) dx$ is

A. 1

B. 2

C. 0

D. 4

Answer: C

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

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

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

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

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

Answer: A

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20. $\int_1^2 e^x \left(\frac{1}{x} - \frac{1}{x^2}\right) dx$ is qual to

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

B. $\frac{e^2}{2} - e$

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

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

Answer: B

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21. $\int_1^3 \frac{\cos(\log x)}{x} dx$ is equal to

A. 1

B. $\cos(\log 3)$

C. $\sin(\log 3)$

D. $\pi/4$

Answer: C

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22. $\int_0^1 \frac{x^2}{1+x^2} dx$ is equal to

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

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

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

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

Answer: D

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