MATHS

BOOKS - DEEPTI MATHS (TELUGU ENGLISH)

DEFINITE INTEGRATION

SOLVED EXAMPLES

1. $\int_{-1}^{1}\left(\sin^{-1}\frac{x}{\sqrt{1-x^2}}+\frac{\cos^{-1}(x)}{\sqrt{1-x^2}}\right)dx=$

A. $\pi/2$

B. π

C. 2π

D. $3\pi/2$

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

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

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

C. $\frac{7\pi}{4}$

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

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3. $\int_0^1 x(1-x)^{10} dx =$

A. $1/130$

B. $1/132$

C. $1/321$

D. $1/130$

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4. $\int_0^3 [x]dx =$

A. 1

B. 2

C. 3

D. 4

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5. $\int_0^{\pi/2} \sin^7 x dx$

A. $14/35$

B. $8/35$

C. $16/35$

D. $26/35$

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

A. π

B. π^2

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

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

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

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

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

C. $\frac{1}{20}$

D. 0

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8. $\int_0^3 (|x| + |x-1| + |x-2|)dx =$

A. $9/2$

B. 7

C. 5

D. $19/2$

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9. $Lt_{n\to\infty}\left\{\frac{1}{n}+\frac{1}{n+1}+\frac{1}{n+2}+\ldots\ldots+\frac{1}{4n}\right\}=$

A. $\pi/4$

B. $\log 4$

C. $\log 2$

D. $\log 3$

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10. $Lt_{n\to\infty}\left[\frac{1}{1+n^2}+\frac{2}{1+n^2}+\ldots\ldots\ldots\ldots+\frac{n}{1+n^2}\right]$

A. 0

B. $-1/2$

C. $1/2$

D. none

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11. The area bounded between the curves $y = x^2$ and $y = x^3$ is

A. $1/6$

B. $1/12$

C. $1/4$

D. $1/3$

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12. The area of the part of the circle $x^2 + y^2 = 8a^2$ and the parabola $y^2 = 2ax$ through which positive X-axis passes is

A. $4a^2\left(\frac{3\pi + 2}{3}\right)$

B. $2a^2\left(\frac{3\pi - 2}{3}\right)$

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

D. $\frac{2a^2(3\pi + 2)}{3}$

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13. Area bounded by the curve $x^{2/3} + y^{2/3} = a^{2/3}$ and $\overrightarrow{O}X, \overrightarrow{O}Y$ is

A. $\frac{3\pi a^2}{16}$

B. $\frac{3\pi a^2}{8}$

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

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

Answer: b

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14. The area bounded by the curve $y = (x-1)(x-2)(x-3)$ and X-axis lying between ordinates x=0 and x=3 is

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

B. $\frac{11}{4}$

C. $\frac{11}{2}$

D. 5

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EXERCISE 1A

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

A. 20

B. 22

C. 25

D. 30

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

A. $e - 1$

B. 1

C. e

D. 2

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

A. 1

B. -2

C. $\sqrt{2}$

D. 2

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

A. 0

B. 3

C. 2

D. 1

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

A. $\log 2$

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

C. 2

D. $\log 3$

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

A. $\log 2$

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

C. 2

D. none

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

A. $\log 2$

B. $1/2 \log 2$

C. 2

D. none

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

A. $\pi/2$

B. `pi//3

C. $\pi/4$

D. $\pi / 4a$

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

A. $\pi / 6$

B. $\pi / 12$

C. $\pi / 24$

D. $\pi / 36$

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

A. $\pi / 2$

B. $\pi/3$

C. $\pi/4$

D. $\pi/4a$

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11. $\int_{-1}^{1} \frac{1}{(1+x^2)^2} dx =$

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

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

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

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

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

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

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

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

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

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

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

B. πa^2

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

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

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14. $\int_{\pi/6}^{5\pi/6} \sqrt{4-4\sin^2 t}\ \ dt =$

A. 0

B. 2

C. 1

D. none

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15. The value of the integral $\int_0^3 \frac{dx}{\sqrt{x+1}+\sqrt{5x+1}}$ is

A. $\frac{11}{15}$

B. $\frac{14}{15}$

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

D. $1+\frac{1}{2}\log\left(\frac{3}{5}\right)$

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16. $\int_0^1 \frac{4x^3}{\sqrt{1-x^8}}dx =$

A. $\pi/3$

B. $\pi/2$

C. $\pi/4$

D. 2π

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17. $\int_0^1 \frac{x^3}{1+x^8}dx =$

A. $\pi/16$

B. $\pi/4$

C. $\pi/2$

D. $\pi/8$

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18. $\int_0^{\pi/4} \left(\tan^4 x + \tan^3 x\right) dx =$

A. 1

B. $1/2$

C. $1/3$

D. $1/4$

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

A. e-1

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

C. $e^{-1} + 1$

D. $e^{-2} - 1$

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20. $\int_{1/\sqrt{3}}^{1} \frac{\left(\tan^{-1} x\right)^3}{1 + x^2} dx =$

A. $\frac{\pi^4}{64}$

B. $\frac{\pi^4}{256}$

C. $\frac{\pi^4}{1024}$

D. $\frac{65\pi^4}{64 \times 1296}$

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21. $\int_{-1}^{3}\left(\tan^{-1}\frac{x}{(x^2+1)}+\tan^{-1}\frac{x^2+1}{x}\right)dx=$

A. π

B. 2π

C. 4π

D. none

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

A. $\frac{e^4}{4}$

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

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

D. none

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

A. $\pi/2$

B. π

C. 1

D. nene

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

A. 1

B. -1

C. 2

D. 0

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25. $\int_0^{\infty} \frac{dx}{\left(x+\sqrt{x^2+1}\right)^3} =$

A. $3/8$

B. $1/8$

C. $-3/8$

D. $-1/8$

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26. $\int_0^x \left(a^{-x} - b^{-x}\right) dx =$

A. $\frac{1}{\log a} - \frac{1}{\log b}$

B. $\log a - \log b$

C. $\log a + \log b$

D. $\frac{1}{\log a} + \frac{1}{\log. b}$

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27. $\int_0^\infty e^{-x \log 2} dx =$

A. 0

B. oo

C. 1

D. $1/\log 2$

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28. $\int_2^3 \frac{2-x}{\sqrt{5x-6-x^2}}dx =$

A. $\pi/2$

B. $-\pi/2$

C. $-\pi/3$

D. $-\pi$

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

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

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

C. $\pi-1$

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

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

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

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

C. $\frac{a}{3}(\pi+2)$

D. $\frac{a}{3}(\pi+3)$

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31. $\int_0^1 \sqrt{x(1-x)}dx =$

A. $\pi/2$

B. $\pi/4$

C. $\pi/6$

D. $\pi/8$

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

A. $\pi/8$

B. $\pi/4$

C. $1/8$

D. none

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33. The value of $\int_{-1}^{1}\left(\sqrt{1+x+x^2}-\sqrt{1-x+x^2}dx\right.$ is

A. 0

B. 1

C. -1

D. none

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34. $\int_{-1}^{1}\left\{\left(\frac{x+2}{x-2}\right)^2+\left(\frac{x-2}{x+2}\right)^2-2\right\}^{1/2}dx=$

A. $8\log\frac{4}{3}$

B. $8\log\frac{3}{4}$

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

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

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35. $\int_0^1 \left(1+e^{-x}\right)dx =$

A. -1

B. 2

C. $1+e^{-1}$

D. $2-e^{-1}$

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

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

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

C. $\tan^{-1}e-\pi/2$

D. none

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37. $\int_0^{\log 5} \frac{e^x \sqrt{e^x - 1}}{e^x + 3} dx =$

A. $3 + 2\pi$

B. $4 - \pi$

C. $2 + \pi$

D. none

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

A. e

B. e+1

C. e-1

D. $2e + 1$

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39. $\int_{\pi/2}^{\pi/2} e^{\sin^2 x} . \sin^{2n+1} x dx =$

A. 0

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

C. 1

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

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

A. 1

B. 2

C. -1

D. -2

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41. $\int_{\pi/4}^{3\pi/4} \frac{1}{1+\cos x} dx$

A. 2

B. -2

C. $1/2$

D. $-1/2$

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

A. $9/2$

B. $27/4$

C. $116/15$

D. $112/15$

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

A. $\log 2$

B. $2\log 2$

C. $3\log 3$

D. $1/2\log 2$

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

A. $2\left[\frac{5}{6}+\log 2\right]$

B. $2\left[\frac{5}{6}-\log 2\right]$

C. $\left[\frac{5}{6}-\log 2\right]$

D. none

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

A. $\sqrt{2}$

B. $1/\sqrt{2}$

C. $2\sqrt{2}$

D. $\pi/2$

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46. $\int_0^1 \frac{x}{(1-x)^{5/4}} dx =$

A. $16/3$

B. $3/16$

C. $-3/16$

D. $-16/3$

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47. $\int_{1/3}^{1} \frac{\left(x - x^3\right)^{1/3}}{x^4} dx =$

A. 3

B. 0

C. 6

D. 4

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48. $\int_{0}^{\pi} \sin^3 x \cos^4 x dx =$

A. $4/35$

B. $4/30$

C. $4/25$

D. $4/33$

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49. $\int_0^{\pi/2} \sin^6 x \cos^5 x dx =$

A. $8/693$

B. $5/693$

C. $4/693$

D. $10/693$

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50. $\int_0^{\pi} -\frac{\sin^3 x}{1+\cos^3 x} dx$

A. $\pi - 1$

B. $\pi + 2$

C. $\pi - 2$

D. $2\pi - 2$

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

A. 10

B. 5

C. $1/10$

D. $1/5$

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52. $\int_{r/6}^{\pi/4} \frac{dx}{\sin 2x} =$

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

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

C. $\log 3$

D. $2\log 3$

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53. $\int_0^{\pi} \frac{\tan x}{\sec x + \cos x} dx =$

A. $\pi/3$

B. $\pi/4$

C. $\pi/2$

D. 2π

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

A. ∞

B. $\pi/4$

C. $\pi/2$

D. none

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55. If $\int_0^k \frac{\cos x}{1+\sin^2 x} dx = \frac{\pi}{4}$ then k=

A. 1

B. $\pi/4$

C. $\pi/2$

D. none

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

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

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

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

D. none

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57. $\int_{-1}^{1} xe^x dx =$

A. $2/e$

B. $e^2/2$

C. e

D. none

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58. $\int_0^1 e^x(x^x+1)^3 dx =$

A. $\frac{e^4}{4} - 4$

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

C. $\frac{(e+1)^4 + 16}{4}$

D. none

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

A. $2\log 2 - 1$

B. $\log 2 - 1$

C. $2\log 2 + 1$

D. $2\log 2 - 2$

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

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

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

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

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

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

A. 0

B. 1

C. 2

D. none

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

A. 1

B. 0

C. 2

D. none

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

A. π

B. $\pi/2$

C. $2\pi/3$

D. $\pi/6$

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

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

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

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

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

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

A. $\pi / 8$

B. $-\pi / 8$

C. $\pi / 4$

D. $\pi / 2$

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

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

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

C. $\frac{\pi}{4} - \frac{1}{2}\log 2$

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

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67. Evaluate the integral

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

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

B. $\frac{\pi}{18} - \frac{1}{2}$

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

D. $\frac{\pi}{8} + \frac{1}{2}$

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68. $2\int_0^1 \frac{\tan^{-1}x}{x}dx =$

A. $\frac{\pi^2}{6} - \frac{\pi}{3} + \frac{1}{2}\log 2$

B. $\frac{\pi^2}{16} + \frac{\pi}{4} + \frac{1}{2}\log 2$

C. $\frac{\pi^2}{16} - \frac{\pi}{4} + \frac{1}{2}\log 2$

D. none

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

A. $\frac{1}{2}\int_0^{\pi/4} \frac{x}{\sin x}dx$

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

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

D. $\frac{1}{2}\int_0^{\pi/2} \frac{x}{\sin x}dx$

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

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

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

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

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

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71. Evaluate the integral

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

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

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

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

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

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

A. $\frac{\pi}{4}-\frac{1}{2}\log 2$

B. $\frac{\pi}{4}+\frac{1}{2}\log 2$

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

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

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73. $\int_0^1 \tan^{-1}\left[\frac{2x-1}{1+x-x^2}\right]dx =$

A. 0

B. $1/2$

C. 1

D. ∞

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

A. 1

B. 2

C. $\pi + 2$

D. $(\pi/2) - 1$

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75. $\int_0^{\pi^2/4} \cos\sqrt{x}dx =$

A. 2

B. $\pi - 2$

C. $\pi + 2$

D. $(\pi/2) - 1$

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

A. 0

B. 1

C. -1

D. 2

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

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

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

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

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

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78. $\int_0^{\pi} e^x \sin x dx =$

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

B. $e^{\pi} + 1$

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

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

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79. If $\int_0^b \frac{dx}{1+x^2} = \int_b^{\infty} \frac{dx}{1+x_2}$, then b=

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

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

C. $\sqrt{2}$

D. 1

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80. $\int_0^{\pi/4} \left[\sqrt{\tan x} + \sqrt{\cot x}\right] = dx$

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

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

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

D. π

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81. $\int_0^{\pi/4} \frac{\sin x + \cos x}{7 + 9\sin 2x} dx =$

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

B. $\frac{\log 3}{36}$

C. $\frac{\log 7}{12}$

D. $\frac{\log 7}{24}$

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82. If $I_1 = \int_e^{e^2} \frac{dx}{\log x}$ and $I_2 = \int_1^2 \frac{e^x}{x} dx$, then

A. $I_1 = I_2$

B. $2I_1 = I_2$

C. $I_1 = 2I_2$

D. none

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83. If $I = \int_0^1 \sqrt{1 + x^3} dx$ then

A. $I > 1$

B. $l \neq \frac{\sqrt{5}}{2}$

C. $I > \frac{\sqrt{7}}{2}$

D. none

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84. If $I = \int_0^1 \frac{dx}{\sqrt{1+x^4}}$, then

A. $l > 0.78$

B. $l < 0.78$

C. $l > 1$

D. none

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85. Evaluate the integral

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

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

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

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

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

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

A. $\frac{1}{\sqrt{3}}\log\left|\frac{5+\sqrt{5}}{5-\sqrt{5}}\right|$

B. $\frac{1}{\sqrt{5}}\log\left|\frac{5-\sqrt{5}}{5+\sqrt{5}}\right|$

C. $\frac{1}{\sqrt{5}}\log\left|\frac{5+\sqrt{5}}{5-\sqrt{5}}\right|$

D. none

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

A. $\pi/3$

B. $\pi/4$

C. $\pi/6$

D. $\pi/2$

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

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

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

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

D. `(pi)/(2sqrt2)

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89. $\int_0^{\pi/2} \frac{1}{4\cos^2 x + 9\sin^2 x} dx =$

A. $\pi/2$

B. $\pi/10$

C. $\pi/5$

D. $\pi/2$

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

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

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

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

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

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

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

B. $\log 2$

C. $\log 3$

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

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EXERCISE 1B

1. If $f(x) = \begin{cases} x^2 & \text{for } 0 \leq x \leq 1 \\ \sqrt{x} & \text{for } 1 \leq x \leq 2 \end{cases}$ then $\int_0^2 f(x)dx =$

A. $(1/3)\left(4\sqrt{2} + 1\right)$

B. $(1/3)\left(4\sqrt{2}-1\right)$

C. $(1/3)\left(2\sqrt{2}-1\right)$

D. $(1/2)\left(3\sqrt{2}-1\right)$

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

A. -2

B. 3

C. 5

D. 8

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3. If f(x) is an even function then $\int_{-\pi}^{\pi} f(x)\sin nx dx =$

A. 0

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

C. $4\int_{0}^{\pi/2} f(x)\sin nx dx$

D. none

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4. $I = \int_{0}^{1} e^{x^2} dx$ satisfies the inequality

A. $0 < l < 1$

B. $-1 \leq l \leq 1$

C. $1 \leq I \leq e$

D. none

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5. $\int_{-\pi/2}^{\pi/2} \sin x . \cosh x dx =$

A. 0

B. $\pi/4$

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

D. none

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

A. 0

B. $\pi/4$

C. e^{π}

D. none

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

A. 0

B. 1

C. $\pi/4$

D. none

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8. $\int_{-1}^{1} \frac{\cosh x}{1+e^x} dx =$

A. 0

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

C. $\frac{e^2-1}{2e}$

D. none

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

A. 0

B. 1

C. $\frac{e^2-1}{2e}$

D. none

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10. $\int_{-\pi/2}^{\pi/2} \frac{\cos x}{1-e^x} dx =$

A. 1

B. 0

C. π

D. $\pi/4$

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11. Evaluate the definite integrals .

$$\int_{-\pi/2}^{\pi/2} \frac{\cos x}{1+e^x} dx$$

A. 0

B. -2

C. 2

D. 1

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

A. $a\pi$

B. $\pi/2$

C. π/a

D. 2π

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13. $a > 0, \int_{-\pi}^{\pi} \frac{\sin^2 x}{1+a^x} dx =$

A. $\pi/2$

B. π

C. $a\pi/2$

D. $a\pi$

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14. $\int_{-1}^{1}(ax^3+bx)dx=0$ for

A. any values of a and b

B. $a>0$ and $b>0$ only

C. $a>0$ and $b<0$ only

D. $a<0$ and $b<0$ only

Answer: a

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15. If $\int_0^x f(t)dt = x + \int_x^1 tf(t)dt$, then the value of f(1) is

A. $1/2$

B. 0

C. 1

D. $-1/2$

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16. If $f(y) = e^y, g(y) = y : y > 0$ and $F(t) = \int_0^t f(t-y)g(y)dy$, then

A. $F(t) = e^t - (1+t)$

B. $F(t) = te^t$

C. $F(t) = te^{-t}$

D. $F(t) = 1 - e^{-t}(1+t)$

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17. The solution for x of the equation $\int_{\sqrt{2}}^{x}(dt)/t\left(\sqrt{t^2-1}\right)=\frac{\pi}{2}$ is

A. $-\sqrt{2}$

B. π

C. $\sqrt{3}/2$

D. $2\sqrt{2}$

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18. $\int_{\log 2}^{t}\frac{dx}{\sqrt{e^x-1}}=\frac{\pi}{6}$, then t=

A. 4

B. $\log 8$

C. $\log 4$

D. none

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

A. $\pi/4$

B. $\pi/2$

C. $\pi/3$

D. $\pi/8$

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

A. $\pi/3$

B. $\pi/2$

C. $\pi/4$

D. $\pi/8$

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21. $\int_{\pi/6}^{\pi/3} \frac{\sin^3 x}{\sin^3 x + \cos^3 x} dx =$

A. $\pi/6$

B. $\pi/12$

C. $\pi/2$

D. $\pi/3$

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22. $\int_0^{\pi/2} \frac{\sec x}{\sec x + \cos ecx} dx =$

A. $\pi/3$

B. $\pi/2$

C. $\pi/4$

D. $\pi/8$

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23. $\int_0^{\pi/2} \frac{\cot x}{\tan x + \cot x} dx =$

A. $\pi/4$

B. $\pi/2$

C. $\pi/3$

D. $\pi/8$

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

A. π

B. $\pi/2$

C. $\pi/3$

D. $\pi/4$

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

A. 0

B. $\pi/2$

C. $\pi/4$

D. π

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

A. π

B. $\pi/2$

C. $\pi/4$

D. $3\pi/2$

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27. $\int_0^{\pi/2} \frac{200\sin x + 100\cos x}{\sin x + \cos x} dx =$

A. 50π

B. 25π

C. 75π

D. 150π

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28. $\int_0^{\pi/2} \frac{5\tan x - 3\cot x}{\tan x + \cot x} dx =$

A. $\pi/2$

B. $\pi/3$

C. $\pi/4$

D. $\pi/8$

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29. $\int_0^{\pi/2} \frac{3\sec x + 5\cos ecx}{\sec x + \cos ecx} dx =$

A. π

B. 2π

C. 3π

D. $\pi/2$

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

A. 0

B. $\pi/2$

C. $\pi/3$

D. $\pi/4$

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

A. ∞

B. $\pi/4$

C. 0

D. none

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

A. 1

B. 0

C. 2

D. none

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33. Show that $\int_0^{\pi/2} \frac{x}{\sin x + \cos x} dx = \frac{\pi}{2\sqrt{2}} \log\left(\sqrt{2}+1\right)$.

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

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

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

D. none

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34. Evaluate the integral

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

A. $\pi^2/2$

B. $\pi^2/3$

C. π^2

D. $\pi^2/4$

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35. $\int_0^{\pi} \frac{x \tan x}{\sec x + \cos x} dx =$

A. $\pi^2/4$

B. $\pi^2/3$

C. $\pi^2/2$

D. π^2

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36. $\int_0^{\pi} \frac{x \tan x}{\sec x + \tan x} dx =$

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

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

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

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

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

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

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

C. $\pi \log 2$

D. none

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38. The value of $\int_0^1 \frac{8\log(1+x)}{1+x^2}dx$ is :

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

B. $\log 2$

C. $\pi \log 2$

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

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

A. 0

B. 1

C. $1/2$

D. 2

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

A. $\pi/2$

B. $\pi/3$

C. $\pi/4$

D. none

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

A. $\pi \log 2$

B. $-\pi \log 2$

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

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

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42. $\int_0^{\pi/2} \log(\cos x)dx =$

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

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

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

D. none

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

A. $\pi \log 2$

B. $-\pi \log 2$

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

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

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

A. 2

B. 4

C. 1

D. 6

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

A. 0

B. 1

C. 2

D. -1

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

A. $\log 2$

B. $-\log 2$

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

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

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

A. $\pi \log 2$

B. $-\pi \log 2$

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

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

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

A. $\pi \log 2$

B. $-\pi \log 2$

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

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

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49. If $I = \int_0^1 \cos\left(2\cot^{-1}\left(\frac{\sqrt{1-x}}{1+x}\right)\right) dx$ then

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

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

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

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

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50. Evaluate the integral

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

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

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

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

D. 2π

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51. Evaluate the integral

$$\int_0^{a} x(a-x)^n dx$$

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

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

C. $\frac{a^{n+2}}{(n-1)(n+2)}$

D. $\frac{a^{n+2}}{(n+1)(n-2)}$

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52. $\int_0^1 x^2(1-x)^5 dx =$

A. $\frac{1}{186}$

B. $\frac{1}{168}$

C. $\frac{1}{68}$

D. $\frac{1}{135}$

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53. $\int_0^5 x(5-x)^{10}dx =$

A. $\frac{(4)^{12}}{132}$

B. $\frac{(5)^{12}}{130}$

C. $\frac{(5)^{12}}{132}$

D. none

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54. $\int_0^2 \frac{2x-2}{2x-x^2}dx =$

A. 0

B. 2

C. 3

D. 4

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55. $\int_0^{\pi} \frac{x.\sin 2x.\sin[(\pi/2)\cos x]}{2x-\pi}dx =$

A. $6/\pi^2$

B. $8/\pi^2$

C. $5/\pi^2$

D. $4/\pi^2$

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56. $\int_0^{\pi} xf(\sin x)dx =$

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

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

C. $\pi\int_0^{\pi} f(\cos x)dx$

D. $\pi \int_0^{\pi} f(\sin x) dx$

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

A. 0

B. $\pi 2$

C. $\pi / 4$

D. π

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58. If f(x) is intergrable on [0,a] then $\int_0^a \frac{f(x)}{f(x) + f(a-x)} dx =$

A. 0

B. 1

C. a

D. a/2

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

A. a-b

B. b-a

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

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

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

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

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61. $\int_2^3 \frac{\sqrt{x}}{\sqrt{5-x}+\sqrt{x}}dx$

A. $1/2$

B. $3/2$

C. $5/2$

D. 0

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

A. 2

B. 1

C. $1/2$

D. $3/2$

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63. $\int_{-a}^{b} \frac{\sqrt[3]{x+a}}{\sqrt[3]{x+a}+\sqrt[3]{b-x}}dx =$

A. a-b

B. 4a+b

C. $(a+b)/2$

D. b-a

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64. If

$f(x) = \frac{e^x}{1+e^x}, I_1 = \int_{f(-a)}^{f(a)} xg\{x(1-x)\}dx$ and $I_2 = \int_{f(-a)}^{f(a)} g\{x(1-x$

then the value of $\frac{I_2}{I_1}$ is

A. 2

B. 1

C. -1

D. -3

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65. Let $l = \int_0^1 \frac{\sin x}{\sqrt{x}} dx$ and $I = \int_0^1 \frac{\cos x}{\sqrt{x}} dx$. Then which one of the following is true?

A. $I < \frac{2}{3}$ and $J < 2$

B. $I < \frac{2}{3}$ and $2 < J$

C. $I > \frac{2}{3}$ and $J < 2$

D. $I > \frac{2}{3}$ and $J > 2$

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66. $\int_{\pi/8}^{3\pi/8} \frac{1}{1 + \cot x} dx =$

A. $\pi/8$

B. 2π

C. $\pi/4$

D. $\pi/2$

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67. $\int_{-2}^{2}\left(x^{11}\cos x+e^{x}\right)dx=$

A. $\sinh 2$

B. $2\sinh 2$

C. $2\cosh 2$

D. $2\tanh 2$

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68. $\int_{-1}^{1}\log\left(\frac{2+x}{2-x}\right)dx=$

A. 1

B. 0

C. 2

D. none

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69. $\int_{-\pi/2}^{\pi/2} \log\left(\frac{2-\sin\theta}{2+\sin\theta}\right) d\theta =$

A. 0

B. 1

C. 2

D. -1

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70. $\int_{-\pi/4}^{\pi/4} \left(\frac{x+\pi/4}{2-\cos 2x}\right) dx =$

A. $\frac{8\pi\sqrt{3}}{5}$

B. $\frac{2\pi\sqrt{3}}{9}$

C. $\frac{4\pi^2\sqrt{3}}{9}$

D. $\frac{\pi^2}{6\sqrt{3}}$

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71. $\int_{-1}^{+1} \frac{d}{dx}\left(\tan^{-1} 1/x\right)dx =$

A. $\pi/2$

B. $\pi/4$

C. $-\pi/2$

D. none

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72. The value of $\int_{-\pi/2}^{\pi/2} \left(x^3 + x\cos x + \tan^5 x + 1\right) dx =$

A. 0

B. 2

C. π

D. none

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73. $\int_{-3\pi/2}^{-\pi/2} \left[(x+\pi)^3 + \cos^2(x+3\pi)\right] dx =$

A. $\pi/2$

B. $(\pi/4) - 1$

C. $\pi^4/32$

D. $\left(\pi^4/32\right) + (\pi/2)$

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

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

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

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

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75. If $f''(x)$ and $f'(x)$ are continuous on [a,b] then $\int_a^b xf''(x)dx =$

A. $[bf'(b) - af(a)] - [f(b) - f(a)]$

B. $[af'(a) - bf(b)] - [f(b) - f(a)]$

C. $[bf'(b) - af'(a)] - [(b) - f(a)]$

D. $[bf'(b) + f(b)] - [af'(a) + f(a)]$

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76. If f(x) and g(x) are continuous functions satisfysing $f(x) = f(a - x)$ and $g(x) + g(a - x) = 2$ then $\int_0^a f(x)g(x)dx =$

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

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

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

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

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

A. -1

B. 0

C. 1

D. $1/2$

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78. $\int_{-\pi}^{\pi} (\cos 2x - \sin 3x)^2 dx =$

A. π

B. 0

C. π

D. 2π

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79. The function $F(x) = \int_0^{\pi} \log\left(\frac{1-x}{1+x}\right) dx$ is

A. an even function

B. an odd function

C. a periodic function

D. none

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80. If $a < 0 < b$ then $\int_a^b \frac{|x|}{x} dx =$

A. b-a

B. a-b

C. a+b

D. 0

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

A. 0

B. 1

C. $1/2$

D. $3/2$

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82. $\int_0^2 [x-2]dx =$

A. 1

B. 2

C. -1

D. -2

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83. $\int_0^2 [|x| + |x-1|]dx =$

A. 3

B. 0

C. 4

D. 2

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84. The value of $\int_{-2}^{3}\left[1-x^{2}\right]dx$ is

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

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

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

D. $\frac{14}{3}$

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85. $\int_{0}^{2}\left|\cos\frac{\pi x}{2}\right|dx=$

A. $1/\pi$

B. $2/\pi$

C. $3/\pi$

D. $4/\pi$

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86. $\int_{1/e}^{e} |\log x| dx =$

A. $1 - 1/e$

B. $2(1 - 1/e)$

C. $1/e - 1$

D. none

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87. $\int_{e^{-1}}^{e^2} \left| \frac{\log x}{x} \right| dx =$

A. $3/2$

B. $5/2$

C. 3

D. 5

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88. $\int_{0.5}^{4.5} [x]dx =$

A. 3

B. 5

C. 8

D. 10

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89. $\int_{0}^{50} (x - [x])dx =$

A. 25

B. 20

C. 15

D. 10

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90. [y] is the integral part of y, then $\int_{\pi/2}^{3\pi/2} [2\sin x]dx =$

A. $-\pi$

B. 0

C. $-\pi/2$

D. $\pi/2$

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91. $\int_0^{1000} e^{x-[x]}dx =$

A. $\frac{e^{1000}-1}{1000}$

B. $\frac{e^{1000}-1}{e-1}$

C. $1000(e-1)$

D. $\frac{e-1}{1000}$

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92. $\int_0^{100} \sin(x-[x])\pi dx =$

A. $100/\pi$

B. $200/\pi$

C. 100π

D. 200π

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93. If [x] denotes the greatest intger function then the velue of $\int_{0.5}^{4.5}[x]dx+\int_{-1}^{1}|x|dx$ is

A. 9

B. 8

C. 7

D. 6

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94. Evaluate $\int_{-\pi/2}^{\frac{\pi}{2}}\sin|x|dx$

A. 0

B. 1

C. 2

D. π

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95. $\int_0^1 |\sin 2\pi x| dx =$

A. 0

B. $-1/\pi$

C. $1/\pi$

D. $2/\pi$

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

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

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

C. $\log 2$

D. $-\log 2$

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97. $\int_0^{100\pi} \sqrt{1-\cos 2x}dx =$

A. $150\sqrt{2}$

B. $100\sqrt{2}$

C. $200\sqrt{2}$

D. $50\sqrt{2}$

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98. $\int_0^{\pi} |\cos\theta - \sin\theta| d\theta$

A. $\sqrt{2}$

B. $2\sqrt{2}$

C. $3\sqrt{2}$

D. $3\sqrt{3}$

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99. The integral `int_(0)^(x) sqrt(1+4 sin^(2). x/2 - 4 sin. x/2)dx equals

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

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

C. $\pi - 4$

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

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100. $\int_{-1}^{3/2} |x \sin \pi x| dx$

A. $\frac{3}{\pi} - \frac{1}{\pi^2}$

B. $\frac{3}{\pi} + \frac{1}{\pi^2}$

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

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

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101. $Lt_{x \to 0} \left(\frac{\int_0^x \sin^3 x}{x^4} \right) =$

A. 0.25

B. 2.5

C. 5.2

D. 0.52

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102. $\int_0^{\pi/3} |\tan x - 1| dx =$

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

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

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

D. $\frac{\pi}{6} + \frac{1}{2}\log 2$

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103. $Lt_{x \to 0} \frac{x^2}{\int_0^x \tan^{-1} t dt}$

A. 1

B. 2

C. 0

D. 4

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104. 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 $\int_0^\infty$

A. $\pi/60$

B. $\pi/20$

C. $\pi/40$

D. $\pi/80$

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105. $\int_0^{\pi/2} \frac{\sin x}{x} dx$ lies between

A. 0 and 1

B. -1 and 1

C. 1 and $\pi/2$

D. none

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106. $A(x) = \begin{vmatrix} x+1 & 2x+1 & 3x+1 \\ 2x+1 & 3x+1 & x+1 \\ 3x+1 & x+1 & 2x+1 \end{vmatrix}$ then $\int_0^1 A(x)dx =$

A. -15

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

C. -30

D. -5

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107. If $f(x) = \begin{vmatrix} 2\cos^2 x & \sin 2x & -\sin x \\ \sin 2x & 2\sin^2 x & \cos x \\ \sin x & -\cos x & 0 \end{vmatrix}$ then $\int_0^{\pi/2} [f(x) + f'(x)]dx =$

A. 0

B. π

C. $\pi/2$

D. none

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108. If $f(x) = \begin{vmatrix} \cos x & 1 & 0 \\ 1 & 2\cos x & 1 \\ 0 & 1 & 2\cos x \end{vmatrix}$ then $\int_0^{\pi/2} f(x)dx =$

A. $1/4$

B. $1/3$

C. $1/2$

D. $-1/3$

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

is

A. 3

B. $2/3$

C. $1/3$

D. 0

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110. $Lt_{x \to 0}\left(\frac{\int_0^x \sin^2 t \cos t dt}{x^3}\right) =$

A. 1

B. $1/3$

C. 1

D. ∞

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111. $Lt_{x \to 0}\left(\frac{\int_0^x \tan^2 t \sec^2 t dt}{x^3}\right) =$

A. 0

B. 1

C. $1/3$

D. $1/2$

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112. $Lt_{x \to o}\left(\frac{\int_0^x \cos^3 t dt}{x}\right) =$

A. 1

B. -1

C. 0

D. none

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113. If $f(t) = \int_{-t}^{t} \frac{e^{-|x|}}{2} dx$ then $\lim_{\infty o} f(t) =$

A. 1

B. $1/2$

C. 0

D. -1

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114. $Lt_{x \to 0} \frac{\int_0^{x^2} \sin \sqrt{t} dt}{x^3} =$

A. $1/3$

B. 1

C. $2/3$

D. none

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115. If $I_1 = \int_0^1 2^{x^2} dx, I_2 = \int_0^1 2^{x^3} dx, \quad I_3 = \int_1^2 2^{x^2} dx, I_4 = \int_1^2 2^{x^3} dx$ then

A. $I_1 > I_2$

B. $I_2 > I_1$

C. $I_3 > I_4$

D. none

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116. If $\int_0^\infty e^{-x^2} dx = \frac{\sqrt{\pi}}{2}$, then $\int_0^\infty e^{-ax^2} dx, a > 0$ is

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

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

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

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

Watch Video Solution

EXERCISE 1C

1. $\int_0^{\pi/2} \sin^9 x dx =$

A. $\frac{128\pi}{315}$

B. $\frac{128}{315}$

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

D. none

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2. $\int_0^{\pi/2} \cos^7 x dx =$

A. $\frac{14}{35}$

B. $\frac{16}{30}$

C. $\frac{16}{35}$

D. $\frac{26}{35}$

Answer: c

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3. $\int_0^{\pi/2} \cos^{10} x dx =$

A. $\frac{14}{35}$

B. $\frac{63\pi}{512}$

C. $\frac{26\pi}{35}$

D. $\frac{26}{35}$

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4. If $I_n = \int_0^{\pi/4} \tan^n \theta d\theta$ for $1, 2, 3, \ldots$ then $I_{n-1} + I_{n+1} =$

A. 0

B. 1

C. $1/n$

D. $1/n + 1$

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5. $\int_0^1 \frac{x^6}{\sqrt{1-x^2}} dx =$

A. $\frac{5\pi}{32}$

B. $\frac{35\pi}{1024}$

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

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

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6. $\int_0^a \left(a^2 - x^2\right)^{5/2} dx =$

A. $\frac{2\pi a^6}{32}$

B. $\frac{5\pi a^6}{32}$

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

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

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7. Find $\int_0^1 x^{3/2}\sqrt{1-x}dx$

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

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

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

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

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8. $\int_0^a x^3 \left(ax - x^2\right)^{3/2} dx =$

A. $-\frac{9\pi a^7}{2048}$

B. $\frac{3\pi a^7}{2048}$

C. $\frac{9\pi a^7}{2048}$

D. $\frac{9\pi a^7}{2345}$

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9. $\int_0^1 x^4(1-x)^{5/2}dx =$

A. $\frac{1384}{45045}$

B. $\frac{84}{5045}$

C. $\frac{384}{45045}$

D. $\frac{284}{45045}$

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10. If $I_1 = \int_{1/e}^{\tan x} \frac{t}{1+t^2}dt$ and $I_2 = \int_{1/e}^{\cot x} \frac{dt}{t(1+t^2)}$ then the values of $I_1 + I_2$ is

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

B. 1

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

D. $\frac{1}{3}\left(e + \frac{1}{e}\right)$

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11. The value of $I = \int_{-\pi/2}^{\pi/2} \sqrt{\cos x - \cos^3 x} dx$ is

A. 0

B. $2/3$

C. $4/3$

D. $1/3$

Watch Video Solution

12. Let $f: R \to R$ be a differentiable function having $f(2) = 6, f'(2) = \frac{1}{48}$.Then $Lt_{x-2} \int_6^{f(x)} \frac{4t^3}{x-2} dt$

A. 24

B. 36

C. 12

D. 18

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

A. 0

B. 1

C. $\pi/4$

D. 42

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14. The value of the integral $I = \int_0^1 x(1-x)^n$ is

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

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

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

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

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

A. $-1/2$

B. 2

C. $1/2$

D. none of these

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16. The value of $\int_0^{\pi} \sin^n x \cos^{2m+1} x dx$ is

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

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

C. $\int_0^{\pi} \cos^{2m-1} x dx$

D. none of these

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17. The value of $\int_{-\pi}^{3\pi} \log(\sec\theta - \tan\theta) d\theta$ is

A. 1

B. 0

C. 2

D. none of these

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18. The value of $\int_0^{\pi/2} \sqrt{\sin 2\theta} \sin\theta d\theta$ is

A. 1

B. 0

C. $\pi/2$

D. $\pi/4$

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19. If $\int_0^{\infty} \frac{dx}{(x^2+4)(x^2+9)} = k\pi$ then the value of k is

A. $1/60$

B. $1/80$

C. $\frac{1}{40}$

D. $1/20$

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20. If f is an odd function then $\int_{-1}^{1}[|x|+f(x)\cos x]dx=$

A. 0

B. 1

C. 2

D. none of these

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

A. π

B. 0

C. 2π

D. $\pi/2$

Answer: a

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

A. π

B. 0

C. $\pi/2$

D. none

Answer: c

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23. $\int_0^{\infty} \left[\frac{2}{e^x}\right] dx =$

A. $\log_e 2$

B. e^2

C. 0

D. $2/e$

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24. $\int_0^{\pi} [\cos x] dx =$

A. $\pi/2$

B. 0

C. π

D. $-\pi/2$

Answer: d

Watch Video Solution

25. $\int_{\pi/2}^{3\pi/2} [2\sin x]dx =$

A. $-\pi$

B. 0

C. $-\pi/2$

D. $\pi/2$

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26. $\int_0^{\pi/4} \sin x . d(x - [x]) =$

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

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

C. 1

D. none

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27. $\int_{-1}^{1} (x - [2x]) dx =$

A. 1

B. 0

C. 2

D. 4

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28. $\int_0^{[x]} (x - [x])dx =$

A. $\frac{1}{2}[x]$

B. 2[x]

C. $\frac{1}{2[x]}$

D. none

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29. $\int_0^2 x^2[x]dx =$

A. $5/3$

B. $7/3$

C. $8/3$

D. $4/3$

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30. $\int_0^{\pi} [\cot x] dx$, where $[\cdot]$ denotes the greatest integer function, is equal to

A. 1

B. -1

C. $-\pi/2$

D. $\pi/2$

Watch Video Solution

31. For $x \in \left(0, \frac{5\pi}{2}\right)$ define, $f(x) = \int_0^x \sqrt{t} \sin t dt$ then f has

A. local minimum at π and local maximum at 2π

B. local maximum at π local minimumat 2π

C. local maximum at π and 2π

D. local minimum at π and 2π

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32. If $g(x) = \int_0^x \cos 4(t)dt$, then $g(x+\pi)$ equals

A. $g(x) - g(\pi)$

B. $g(x).\, g(\pi)$

C. $\frac{g(x)}{g(\pi)}$

D. $g(x) + g(\pi)$

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33. The slope of the tangent to the curve $y = \int_0^x \frac{1}{1+t^3} dt$ at the point, where x=1 is

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

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

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

D. 1

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EXERCISE 1D

1. $Lt_{n \to \infty} \sum_{r=0}^{n-1} \frac{n}{n^2 + r^2} =$

A. 1

B. π

C. $\pi/2$

D. $\pi/4$

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2. $Lt_{n\to\infty}\sum_{r=1}^{n}\frac{1}{\sqrt{4n^2-r^2}}=$

A. $\pi/2$

B. $\pi/3$

C. $\pi/6$

D. $\pi/5$

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3. $Lt_{n\to\infty}\sum_{r=1}^{n-1}\frac{1}{\sqrt{n^2-r^2}}=$

A. π

B. $\pi/2$

C. $\pi/3$

D. $\pi/6$

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4. $Lt_{n\to\infty}\frac{1}{n}\sum_{r=1}^{2n}\frac{r}{\sqrt{n^2+r^2}}=$

A. $1+\sqrt{5}$

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

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

D. $1+\sqrt{2}$

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5. $Lt_{n\to\infty}\sum_{r=1}^{n}\frac{1}{n}\left[\sqrt{\frac{n+r}{n-r}}\right]$

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

B. 2π

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

D. $(\pi/(2)+1$

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6. $Lt_{n\to\infty}\left\{\frac{1}{n+1}+\frac{1}{n+2}+\ldots\ldots+\frac{1}{2n}\right\}=$

A. $\log 2$

B. $\log 3$

C. 4

D. $\pi/2$

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7. $Lt_{n\to\infty}\sum_{r=0}^{n-1}\frac{1}{n+r}=$

A. $\log 2$

B. $\log 2$

C. $1/2\log 2$

D. none

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8. $Lt_{n\to\infty}\left\{\frac{1}{n}+\frac{1}{n+1}+\frac{1}{n+2}+\ldots\ldots+\frac{1}{3n}\right\}=$

A. $p/4$

B. $\pi/6$

C. $\log 2$

D. $\log 3$

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9. $Lt_{n\to\infty}\left\{\frac{1}{2n+1}+\frac{1}{2n+2}+\frac{1}{2n+3}+\ldots\ldots\ldots+\frac{1}{2n+n}\right\}=$

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

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

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

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

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10. $Lt_{n\to\infty}\left[\frac{1}{3n+1}+\frac{1}{3n+2}+\ldots\ldots\ldots+\frac{1}{3n+n}\right]=$

A. $\log(2/3)$

B. $\log(3/2)$

C. $\log(4/3)$

D. none

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11. $Lt_{n\to\infty}\left[\frac{1}{1-n^2}+\frac{2}{1-n^2}+\ldots\ldots+\frac{n}{1-n^2}\right]=$

A. 0

B. $-1/2$

C. $1/2$

D. none

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12. $Lt_{n\to\infty}\left\{\frac{n+1}{n^2+1^2}+\frac{n+2}{n^2+2^2}+\ldots\ldots+\frac{1}{n}\right\}$

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

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

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

D. none

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13. $Lt_{n-\infty}\left[\frac{1}{n^3}+\frac{2^2}{n^3}+\ldots\ldots\ldots+\frac{n^2}{n^3}\right]=$

A. 0

B. $1/2$

C. $1/3$

D. none

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14. $Lt_{n\to\infty}\frac{[1+4+9+.....+n^2]}{n^3}$

A. 2

B. 3

C. $1/2$

D. $1/3$

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15. $Lt_{n\to\infty}\frac{1^9+2^9+3^9+.....+n^9}{n^{10}}=$

A. $1/2$

B. $1/5$

C. $1/10$

D. $1/15$

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16. Evaluate the limit .

$$\underset{n \to 00}{\text{Lt}} \frac{1 + 2^4 + 3^4 + \ldots\ldots + n^4}{n^5}$$

A. zero

B. $1/4$

C. $1/5$

D. $1/30$

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17. $Lt_{n \to \infty} \sum_{r=1}^{n} \frac{1}{n} e^{r/\pi}$ is

A. e

B. e+1

C. 1-e

D. e-1

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18. $Lt_{n\to\infty}\left[\frac{1}{1+n^3}+\frac{4}{8+n^3}+\frac{9}{27+n^3}+\ldots\ldots+\frac{1}{2n}\right]=$

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

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

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

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

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19. $Lt_{n\to\infty}\left[\frac{1^3}{n^4+1^4}+\frac{2^3}{n^4+2^4}+\ldots\ldots\ldots+\frac{1}{2n}\right]=$

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

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

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

D. $\log 2$

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20. By the definition of the definite integral, the value of $\lim_{n\to\infty}\left(\frac{1^4}{1^5+n^5}+\frac{2^4}{2^5+n^5}+\frac{3^4}{3^5+n^5}+\ldots\ldots\ldots\ldots+\frac{n^4}{n^5+n^5}\right)$

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

B. $\frac{1}{4}\log 2$

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

D. $\log 2$

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21. $Lt_{n\to\infty}\left\{\frac{\sqrt{1}+\sqrt{2}+\sqrt{3}+\ldots\ldots\ldots+\sqrt{n}}{n\sqrt{n}}\right\}$

A. 0

B. 1

C. $2/3$

D. $3/2$

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22. Evaluate the limit.

$$\lim_{n\to 00}\frac{\sqrt{n+1}+\sqrt{n+2}+\ldots\ldots\ldots+\sqrt{n+n}}{n\sqrt{n}}$$

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

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

C. $\frac{\left(2\sqrt{2}+1\right)}{3}$

D. none

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23.

$$Lt_{n\to\infty}\left[\frac{\sqrt{n^2-1^2}}{n^2}+\frac{\sqrt{n^2-2^2}}{n^2}+\frac{\sqrt{n^2+3^2}}{n^2}+\ldots\ldots\ldots+nterms\right]=$$

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

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

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

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

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24. $Lt_{n\to\infty}\left[\frac{1}{\sqrt{n^2-1^2}}+\frac{1}{\sqrt{n^2-2^2}}+\frac{1}{\sqrt{(2n-1)}}\right]=$

A. π

B. 2π

C. $\pi/2$

D. $3\pi/2$

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25. $Lt_{n\to\infty}\left\{\frac{1}{\sqrt{n^2+1}}+\frac{1}{\sqrt{n^2+2^2}}+\ldots\ldots+\frac{1}{\sqrt{n^2+n^2}}\right\}=$

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

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

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

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

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26.

$$Lt_{n\to\infty}\left[\frac{n^{1/2}}{n^{3/2}}+\frac{n^{1/2}}{(n+3)^{3/2}}+\frac{n^{1/2}}{(n+6)^{3/2}}+\ldots\ldots+\frac{n^{1/2}}{\{n+3(n-1)\}^{3/2}}\right.$$

A. $1/3$

B. $1/5$

C. $1/10$

D. $1/2$

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27. $Lt_{n\to\infty}\frac{1}{n}\left\{\sin^2\frac{\pi}{2n}+\sin^2\frac{2\pi}{2n}+\ldots\ldots\ldots+\sin^2\frac{n\pi}{2n}\right\}$

A. 0

B. 1

C. $1/2$

D. 2

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28. $Lt_{n\to\infty}\frac{1}{n}\left[\sec^2\frac{\pi}{4n}+\sec^2\frac{2\pi}{4n}+.....+\sec^2\frac{n\pi}{4n}\right]=$

A. $4/\pi$

B. $2/\pi$

C. $3/\pi$

D. $5/\pi$

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29. $\underset{n \to \infty}{Lt}\left[\frac{1}{n^2}\sec^2.\frac{1}{n^2}+\frac{2}{n^2}\sec^2.\frac{4}{n^2}+\ldots+\frac{1}{n}\sec^2 1\right]=$

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

B. $\frac{1}{2}\cos ec1$

C. $\tan 1$

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

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30. Evaluate $\lim_{n\to\infty}\left[\left(1+\frac{1}{n}\right)\left(1+\frac{2}{n}\right)\cdots\left(1+\frac{n}{n}\right)\right]^{\frac{1}{n}}$

A. e

B. $1/e$

C. $4/e$

D. $8/e$

Watch Video Solution

31. Evaluate the limit .

$$\lim_{n \to 00}\left[\left(1+\frac{1}{n^2}\right)\left(1+\frac{2^2}{n^2}\right).....\left(1+\frac{n^2}{n^2}\right)\right]^{\frac{1}{n}}$$

A. $e^{(\pi-4)/2}$

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

C. $\frac{e^{(\pi-4)/2}}{2}$

D. none

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32. $\lim_{n \to \infty}\left(\frac{(n+1)(n+2)....3n}{n^{2n}}\right)^{1/n}$ is equal to

A. $\frac{18}{e^4}$

B. $\frac{27}{e^2}$

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

D. $3\log 3 - 2$

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EXERCISE 1E

1. The area bounded by $y = x^2 + 2,$ X-axis, x=1 and x=2 is

A. $16/3$

B. $17/3$

C. $13/3$

D. $20/3$

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2. The area of the region bounded by the curve $y = \left(x^2 + 2\right)^2 + 2x$ between the ordinates x=0 and x=2

A. $436/15$

B. $208/3$

C. $236/5$

D. $340/13$

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3. The area, in square unit, of the region bonuded by the curve $x^2 = 4y$, the line x=2 and the x-axis is

A. 1

B. $2/3$

C. $4/3$

D. $8/3$

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4. The area (in square units) of the region bounded by $x^2 = 8y$, $x = 4$ and x-axis is

A. $2/3$

B. $4/3$

C. $8/3$

D. $10/3$

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5. The area of the region bonuded by the curve $y = x^3$, x-axis and the ordinates x=1, x=4 is

A. $255/4$

B. $155/4$

C. $55/4$

D. $355/4$

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6. The area bounded by the curve $y = 1 + 8/x^2$ with x-axis and the ordinates at x=2 and x=4 is

A. 2

B. 3

C. 4

D. 5

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7. The area under the curve $y = x^2 - 3x + 2$ with bonudaries as x-axis and the ordinates x=0,x=3 is

A. $3/8$

B. $2/3$

C. $3/6$

D. $23/3$

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8. The area bounded by the curve $y = 4 - x^2, y = 0, y = 3$ is

A. $28/3$

B. $32/3$

C. $13/6$

D. $23/3$

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9. The area bounded by the X-axis and the curve $y = 4x - x^2 - 3$ is

A. $1/3$

B. $2/3$

C. $4/3$

D. $8/3$

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10. The area bounded by the parabola $y = (x - 4)(x - 1)$ and X-axis is

A. $9/2$

B. $6/5$

C. $3/4$

D. $2/5$

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11. The area bounded by the curve $y = \frac{x^2}{4} + \frac{x}{4} - \frac{1}{2}$ with X axis in [0, 2] is

A. $1/5$

B. $3/5$

C. $3/4$

D. $2/5$

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12. The area of the region between $x - y + 2 = 0$ and the curve $x = \sqrt{y}$, Y-axis is

A. 9

B. $9/2$

C. $10/3$

D. none

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13. The area enclosed between the curve $y = \log_e(x + e)$ and the co-ordinate axes is

A. 1

B. 2

C. 3

D. 4

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14. The area of the region bounded by the curve $y = \sin$, x x-axis and the ordinates $x = 0$, $x = \pi/3$ is

A. $1/3$

B. $1/2$

C. $3/2$

D. $2/3$

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15. The area of the region bounded by the curve $y = \sin x$, x-axis in $[0, 2\pi]$ is

A. 4

B. 3

C. 2

D. 1

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16. The area bounded by the curve $y = \cos ax$ in one arc of the curve is

A. 2a

B. $1/a$

C. $2/a$

D. $2a^2$

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17. The area under the curve $y = \sin 2 + \cos 2x$ and x-axis from x=0 to $x = \pi/4$ is

A. 4

B. 3

C. 2

D. 1

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18. The area bounded by the curve $y = \sin x, y = \cos x$ and y-axis is

A. $\sqrt{2}$

B. $\sqrt{2} + 1$

C. $\sqrt{2} - 1$

D. $\sqrt{2} + 2$

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19. The area bounded by the curesy $y = \cos x$ and $y = \sin x$ between the ordinates and $x = \frac{3\pi}{2}$ is

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

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

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

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

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20. The line $x = \frac{\pi}{4}$ divides the area of the region bounded by $y = \sin x, y = \cos x$ and x-axis $\left(0 < x < \frac{\pi}{2}\right)$ into two regions of areas A_1 and A_2. Then $A_1 : A_2$

A. $4:1$

B. $3:1$

C. $2:1$

D. $1:1$

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21. Area of the region bounded by $y = |5\sin x|$ from x=0 to $x = 4\pi$ and x-axis is

A. 10

B. 20

C. 40

D. 80

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22. The area bounded by $y = \cos x, y = x + 1, y = 0$ is

A. $3/2$

B. $2/3$

C. $1/2$

D. $5/2$

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23. The ratio of the areas bounded by $y = \cos x, y = \cos 2x$ between x=0 and $x = \pi/3$ and the x-axis is

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

B. $1:2$

C. $1:1$

D. $3:1$

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24. The area of the region bounded by the curve $y = \tan x$ tangent drawn to the curve at $x = \pi/4$ and the x-axis is

A. $\log 2 - \frac{1}{4}$

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

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

D. none

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25. Area of the region bounded by the x-axis and curves $y = \tan x(-\pi/3 \leq x \leq \pi/3)$ and $y = \cot x(\pi/6 \leq x \leq 3\pi/2)$ is

A. $\log 2$

B. $2\log 2$

C. $\log \sqrt{2}$

D. none

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26. The area bounded by the parabola $x = 4 - y^2$ and the y-axis in square units is

A. $3/32$

B. $32/3$

C. $33/2$

D. $16/3$

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27. The area (in square units) of the region bounded by the curves 2x=y^(2) -1 and x=0

A. $1/3$

B. $2/3$

C. 1

D. 2

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28. The area of the region bounded by the curve $y^2 = 4x,$ y-axis and the lines y=1, y=3 is

A. $28/3$

B. $32/3$

C. $13/6$

D. $23/3$

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29. The area bounded by the curve $x = y^2 + 4y$ with y-axis is

A. $28/3$

B. $32/3$

C. $13/6$

D. $23/3$

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30. The area bounded by $x = 0, x = 6 + 5y - y^2$ is

A. $\frac{517}{6}$

B. $\frac{278}{3}$

C. $\frac{280}{3}$

D. $\frac{343}{6}$

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31. The area bounded by the curve $y^2 = 4x$ and the lines $x = 1, x = 9$ is

A. $\frac{436}{15}$

B. $\frac{208}{3}$

C. $\frac{236}{5}$

D. $\frac{340}{13}$

Watch Video Solution

32. The area bounded by $y^2 = 4x$ and $y = 2x - 4$ is

A. 9

B. 5

C. 4

D. 2

Watch Video Solution

33. The area of the figure bounded by the curves $y^2 = 2x + 1$ and $x - y - 1 = 0$ is

A. $2/3$

B. $4/3$

C. $8/3$

D. $16/3$

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34. The area between the curve $y^2 = 9x$ and the line $y = 3x$ is

A. $1/3$

B. $8/3$

C. $1/2$

D. $4/3$

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35. The polar of (a,0) w.r.t the parabola $y^2 = 4ax$ is

A. $8a^2$

B. $4a^2$

C. $8a^2/3$

D. $4a^2/3$

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36. The area of region bounded by the curve $y^2 = 4ax$ and the line $x = a(a > 0)$ is

A. $2a^2/3$

B. $a^2/3$

C. $8a^2/3$

D. $4a^2/3$

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37. The area bounded by the parabola $x^2 = 4by$ and the double absissa $y = a$ is

A. $8\frac{a^{1/2}b^{3/2}}{3}$

B. $8\frac{b^{1/2}a^{3/2}}{3}$

C. $4\frac{a^{1/2}b^{3/2}}{3}$

D. $4\frac{b^{1/2}a^{3/2}}{3}$

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38. The area bounded by the curve $x^2 = 4ay$ and the line $y = 2a$ is

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

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

C. $\frac{8a^2}{3}$

D. $\frac{16\sqrt{2}a^2}{3}$

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39. The area contained between the curve $xy = a^2$, the vertical line $x = a, x = 4a(a > 0)$ and x-axis is

A. $a^2 \log 2$

B. $2a^2 \log 2$

C. $a \log 2$

D. $2a \log 2$

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40. The area bounded by the curve $xy = 4$, x-axis and the or dinates $x = 2, x = 5$ is

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

B. $4 \log \frac{5}{2}$

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

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

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41. The area between the parabolas $y^2 = 4ax$ and $x^2 = 4ay$ is

A. $\frac{16a^2}{3}$

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

C. $\frac{10a^2}{3}$

D. $\frac{16a^2}{5}$

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42. The area included between the parabolas $y^2 = 4ax, x^2 = 4by$ is

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

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

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

D. none

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43. The area (in square units) bounded by the curves $y^2 = 4x$ and $x^2 = 4y$ in the plane is

A. $8/3$

B. $16/3$

C. $32/3$

D. $64/3$

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44. Find the area bounded between the curves $y = x^2, y = \sqrt{x}$

A. $1/3$

B. $8/3$

C. $1/2$

D. $4/3$

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45. The area of the region bounded by the curves $y = 9x^2$ and $y = 5x^2 + 4$ (in square units) is

A. 64

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

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

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

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46. If the area bounded by the curves $y = ax^2$ and $x = ay^2, (a > 0)$ is 3 sq. units, then the value of a is

A. $2/3$

B. $1/3$

C. 1

D. 4

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47. The area bounded by the curves $y = x, y = x^3$ is

A. $1/4$

B. $1/6$

C. $1/12$

D. $1/2$

Watch Video Solution

48. The area of the region enclosed by the curves $y = x^2$ and $y = x^3$ is

A. $1/12$

B. $1/6$

C. $1/3$

D. 1

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49. The area in square unit bounded by the curves $y = x^3, y = x^2$ and the ordinates x=1, x=2 is

A. $17/12$

B. $12/13$

C. $2/7$

D. $7/2$

Watch Video Solution

50. The area bounded by y=3x and $y = x^2$ is

A. 10

B. 5

C. 4.5

D. 9

Watch Video Solution

51. The area between the parabola $y = x^2$ and the line $y = 2x$ is

A. $1/3$

B. $8/3$

C. $1/2$

D. $4/3$

Watch Video Solution

52. The area bounded between the parabolas $x^2 = \frac{y}{4}$ and $x^2 = 9y$, and the straight line $y = 2$ is

A. $\frac{20\sqrt{2}}{3}$

B. $10\sqrt{2}$

C. $20\sqrt{2}$

D. $\frac{10\sqrt{2}}{3}$

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53. The area bonuded by the curve $x^2 = 4y$ and the line $x = 4y - 2$ is

A. $9/8$

B. $8/3$

C. $1/2$

D. $1/3$

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54. The area of the region bounded by $y = x^2, y = x + 2, x = -1$ and $x = 2$ is

A. $9/2$

B. $8/3$

C. $1/2$

D. $1/3$

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55. The area bounded by the curve $y = x^2$ and the lines $y = 3x, x = 1, x = 3$ is

A. $9/2$

B. $8/3$

C. $1/2$

D. $10/3$

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56. The area (in square units) bounded by the curves $y = \sqrt{x}, 2y - x + 3 = 0$, x-axis, and lying in the fir stquadrant is :

A. 18

B. $27/4$

C. 9

D. 36

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57. The area enclosed between the curves $y^2 = x$ and $y = |x|$ is

A. $2/3$

B. 1

C. $1/6$

D. $1/3$

Watch Video Solution

58. The area bounded by the curve $y^2 = x - 1$ and the line $y = x - 3$ is

A. $9/3$

B. $8/3$

C. $1/2$

D. $10/3$

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59. The area (in sq. units) of the region described by $\{(x, y) : y(2) \leq 2x \text{ and } y^2 \leq 2x \text{ and } y \geq 4x - 1\}$

A. $\frac{7}{32}$

B. $\frac{5}{64}$

C. $\frac{15}{64}$

D. $\frac{9}{32}$

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60. The area of the region bounded by the parabola $(y - 2)^2 = x - 1$, the tangent to the parabola at the point (2,3) and the x-axis is

A. 6

B. 9

C. 12

D. 3

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61. The area of the region bounded by the curves $y = x^2 + 2, y = x, x = 0$ and $x = 3$ is

A. $4/3$ sq. unit

B. $2/3$ sq. unit

C. $21/2$ sq. unit

D. 27 sq. unit

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62. The area (in square units) of the region bounded by $x = -1, x = 2, y = x^2 + 1$ and $y = 2x - 2$ is

A. 7

B. 8

C. 9

D. 10

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63. The area of the plane region bounded by the curves $x + 2y^2 = 0$ and $x + 3y^2 = 1$ is equal to

A. $1/3$

B. $2/3$

C. $4/3$

D. $5/3$

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64. The area of the region bounded by the curve $\sqrt{x}+\sqrt{y}=\sqrt{a}(x, y>0)$ and the coondinate axes is

A. a^2

B. $a^2/2$

C. $a^2/3$

D. $a^2/6$

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65. The area bounded by the curves $y=3x-x^2$ and $y=x^2-x$ is

A. $1/3$

B. $8/3$

C. $1/2$

D. $4/3$

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66. The area in the first quadrant enclosed by the axis, the line $x = y\sqrt{3}$ and the circle $x^2 + y^2 = 4$ is

A. $\pi/2$

B. $\pi/3$

C. $\pi/4$

D. $\pi/6$

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67. The area common to the circle $x^2 + y^2 = 16a^2$ and the parabola $y^2 = 6ax$ is

A. $4a^2\left(8\pi-\sqrt{3}\right)$

B. $\frac{4a^2\left(4\pi+\sqrt{3}\right)}{3}$

C. $\frac{4a^2\left(8\pi-\sqrt{3}\right)}{3}$

D. none

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68. The area included between the parabola $y=\frac{x^2}{4a}$ and the curve $y=\frac{8a^3}{(x^2+4a^2)}$ is

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

B. $a^2\left(2\pi-\frac{8}{3}\right)$

C. $a^2\left(2\pi+\frac{4}{3}\right)$

D. $a^2\left(2\pi-\frac{4}{3}\right)$

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69. The area (in square units) of the region enclosed by the two circles $x^2 + y^2 = 1$ and $(x-1)^2 + y^2 = 1$ is

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

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

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

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

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70. The area (in sq. units) of the region $\{(x, y) : y^2 \geq 2x \text{ and } x^2 + y^2 \leq 4x, x \geq 0, y \geq 0\}$ is

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

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

C. $\frac{\pi}{2}+\frac{4}{3}$

D. $\frac{\pi}{2}-\frac{4}{3}$

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71. The area (in sq. units) of the region $\{(x, y): y^2 \geq 2x \text{ and } x^2+y^2 \leq 4x, x \geq 0, y \geq 0\}$ is

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

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

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

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

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72. Let AOB be the positive quadrant of the ellipse $\frac{x^2}{a^2}+\frac{y^2}{b^2}=1$ with OA=a , OB=b .

Then show that the area bounded between the chord AB and the arc AB of the ellipse is $\frac{(\pi-2)ab}{4}$

A. πab

B. $(\pi-2)ab$

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

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

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73. Area of the region bounded by $y=\{x\}$, the x-axis and the ordinates $x=1, x=2$ is

A. 2

B. 1

C. $1/2$

D. none

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74. The area bounded by the curves $x = y^2$ and $x = 3 - 2y^2$ is

A. 3

B. 4

C. 1

D. 2

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75. The area of region bounded by the curve $y^2 = 2y - x$ and the y-axis is

A. $4/3$ sq. unit

B. $2/3$ sq. unit

C. $21/2$ sq. unit

D. 27 sq. unit

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76. The area of the region bounded by $a^2y^2 = x^2(a^2 - x^2)$ is

A. $a^2/3$

B. $2a^2/3$

C. $4a^2/3$

D. none

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77. Area of the region bounded by $y = |x| \text{ and } y = 2$ is

A. 4

B. 2

C. $1/2$

D. 1

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78. The area between the curve $y = 1 - |x|$ and x-axis is

A. $1/2$

B. 1

C. $1/4$

D. $1/3$

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79. The area of the region bounded by the curves $y = |x - 2|, x = 1, x = 3$ and the x-axis is

A. 1

B. 4

C. 3

D. 2

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80. Find the area enclosed with in the curve

$|x| + |y| = 1$

A. $\sqrt{2}$

B. `2

C. $2\sqrt{2}$

D. 4

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81. The area bounded by $\frac{|x|}{a} + \frac{|y|}{b} = 1$, where $a > 0$ and $b > 0$ is

A. $1/2ab$

B. ab

C. 2ab

D. 4ab

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82. The area of the region bounded by the curves $y = |x - 1|$ and $y = 3 - |x|$ is

A. 2

B. 3

C. 4

D. 1

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83. The area of the region bounded by the curves $y = x^2$ and $y = \frac{2}{1 + x^2}$ is

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

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

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

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

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84. The area of the region bounded by the curves $y = ex \log x$ and $y = \frac{\log x}{ex}$ is

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

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

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

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

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85. Area of the region bounded by $y = e^x$, $y = e^{-x}$ and the line $x = 1$ is

A. $e + 1/e$

B. $e - 1/e$

C. $e + e^{-1} + 2$

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

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86. The area of the region bounded by the curves $y = 2^x$, $y = 2x - x^2$ and the lines $x = 0$, $x = 2$ is

A. $3\log 2 - \frac{4}{3}$

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

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

D. $\frac{3}{\log 2} + \frac{4}{3}$

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87. The area bounded by the curves $y = \log x, y = 2^x$ and the lines $x = \frac{1}{2}, x = 2$ is

A. $\frac{1}{\log 2}(4 - \sqrt{2}) - \frac{5}{2}\log 2 + \frac{3}{2}$

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

C. $\frac{5}{2}\log 2 + \frac{3}{2}$

D. none

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88. The area bounded by the curves $y = xe^x, y = xe^{-x}$ and line $x = 1$, is

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

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

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

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

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89. If x=a divides the area bounded by x-axis, part of the curve $y = 1 + 8/x^2$ and the ordinates $x = 2, x = 4$ into equal parts then a=

A. 2

B. $2/\sqrt{2}$

C. $1/\sqrt{2}$

D. $2\sqrt{2}$

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90. The area bounded by the curve $y = x(x-1)^2$, y-axis and the line y=2 is

A. $10/3$

B. $5/3$

C. $20/3$

D. none

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91. The area bounded by the circle $x^2 + y^2 = a^2$ and the line $x + y = a$ in the first quadrant is

A. $(\pi - 2)a^2$

B. $\frac{1}{4}(\pi - 2)a^2$

C. πa^2

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

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92. If area bounded by the curves $y^2 = 4ax$ and $y = mx$ is $a^2/3$ then the value of m is

A. 2

B. -2

C. $1/2$

D. none

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93. The parabolas $y^2 = 4x, x^2 = 4y$ divide the square region bounded by the lines x = 4, y = 4 and the co-ordinate axes. If S_1, S_2, S_3 are respectively

the areas of these parts numbered from top to bottom then $S_1 : S_2 : S_3$ is

A. $1:2:1$

B. $1:2:3$

C. $2:1:2$

D. $1:1:1$

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94. The area of the region enclosed by the curves $y = x, x = e, y = \frac{1}{x}$ and the positive x-axis is

A. $3/2$ square units

B. $5/2$ square units

C. $1/2$ square units

D. 1 square units

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EXERCISE 2 (SPECIAL TYPE QUSTIONS) CHOOSE THE CORRECT ANSWER FROM THE ALTERNATIVES 1,2,3 OR 4 GIVEN (SET-1)

1. $\int_{\sqrt{2}/3}^{\sqrt{3}/3} \frac{dx}{\sqrt{4-9x^2}} = \frac{\pi}{36}$

II $\int_{-1}^{1} \frac{1}{(1+x^2)^2} dx = \frac{\pi}{4} + \frac{1}{2}$

A. only I is true

B. only II is true

C. both I and II are true

D. neither I nor true

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2. I : $\int_0^a \sqrt{a^2 - x^2} dx = \pi a^2$

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

A. only I is true

B. only II is true

C. both I and II are true

D. neither I nor true

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3. I : $\int_0^{\pi/2} \sin^6 x \cos^5 x dx = \frac{8}{693}$

II : $\int_0^{\pi/4} \frac{\sin^9 x}{\cos^{11} x} dx = \frac{1}{10}$

A. only I is true

B. only II is true

C. both I and II are true

D. neither I nor true

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

II : $\int_0^1 x\tan^{-1}.\, xdx = \frac{\pi}{4} - \frac{1}{2}$

A. only I is true

B. only II is true

C. both I and II are true

D. neither I nor true

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5. I : $\int_0^{\pi/2} \frac{\sqrt{\cot x}}{\sqrt{\tan x}+\sqrt{\cot x}}dx = \frac{\pi}{4}$

II : $\int_0^{\pi/2} \frac{2\sin x + 3\cos x}{\sin x + \cos x}dx = \frac{\pi}{4}$

A. only I is true

B. only II is true

C. both I and II are true

D. neither I nor true

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6. I : The area, in square unit, of regin bounded by the curve $x^2 = 4y$ the line x=2 and the x-axis is $2/3$ sq. unit.

II : The area (in square units) of the region bounded by $x^2 = 8y$, $x = 4$ and x-axis is $8/3$ sq. unit.

A. only I is true

B. only II is true

C. both I and II are true

D. neither I nor true

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EXERCISE 2 (SPECIAL TYPE QUSTIONS) CHOOSE THE CORRECT ANSWER FROM THE ALTERNATIVES 1,2,3 OR 4 GIVEN (SET-2)

1. If a, b, c are the values of $\int_0^3 [x]dx, \int_{0.5}^{4.5} [x]dx, \int_0^2 [x^2]dx$ then the ascending order of a,b, c is

A. a, b,c

B. b, c, a

C. c, a, b

D. a,c ,b

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2. If a,b,c are the values of $\int_0^{\pi/2} \sin^4 x dx, \int_0^{\pi/2} \sin^6 x dx, \int_0^{\pi/2} \sin^8 x$ dx then the ascending order of a,b, c is

A. a, b,c

B. b,c,a

C. c, a, b

D. c, b, a

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3. If a, b, c are the values of $\int_0^{\pi/2} \cos^5 x dx, \int_0^{\pi/2} \cos^7 x dx, \int_0^{\pi/2} \cos^9 x dx$ then the descending order of a, b, c is

A. a, b, c

B. b,c,a

C. c, a, b

D. a,c,b

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4. If a, b,c are the values of $\int_0^{\pi/2} \sin^6 x dx, \int_0^{\pi} \sin^6 x dx, \int_0^{2\pi} \sin^6 x dx$ then the ascending order of a, b, c is

A. a, b, c

B. b, c,a

C. c, b, a

D. a, c, b

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5. If a, b,c are the values of $\int_0^{\pi/2} \sin^6 x dx, \int_0^{\pi} \sin^6 x dx, \int_0^{2\pi} \sin^6 x dx$ then the ascending order of a, b, c is

A. a,b, c

B. b,c,a

C. c, b, a

D. a,c,b

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EXERCISE 2 (SPECIAL TYPE QUSTIONS) CHOOSE THE CORRECT ANSWER FROM THE ALTERNATIVES 1,2,3 OR 4 GIVEN (SET-3)

1. Match the following.

I	$\int_0^{\pi/2}\sqrt{1-\cos 2x}dx =$	(a)	2
II	$\int_0^{\pi/2}\sqrt{1+\sin 2x}dx =$	(b)	$\sqrt{2}$
III	$\int_0^1 \frac{x}{1+x^2}dx =$	(c)	$\log 2$
IV	$\int_0^{\pi/2}\frac{\cos x}{1+\sin x}dx =$	(d)	$\frac{1}{2}\log 2$

A. a, b,c ,d

B. b,c a,d

C. b, a,d,c

D. c, d, b, a

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EXERCISE 2 (SPECIAL TYPE QUSTIONS) CHOOSE THE CORRECT ANSWER FROM THE ALTERNATIVES 1,2,3 OR 4 GIVEN (SET-4)

1. $A: \int_0^{\pi/2} \frac{\sqrt{\sin x}}{\sqrt{\sin x}+\sqrt{\cos x}}dx = \frac{\pi}{4}$

$R: \int_0^{\pi/2} \frac{f(\sin x)}{f(\sin x)+f(\cos x)}dx = \frac{\pi}{4}$

A. Both A and R are true R is the correct explanatino of A

B. Both A and R are true but R is not correct explanation of A

C. A is true but R is false

D. A is false but R is true

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2.

$A: \int_0^{\pi/2} \frac{5\tan x - 3\cot x}{\tan x + \cot x}dx = \frac{\pi}{2}$ $R: \int_0^{\pi/2} \frac{a\tan x + b\cot x}{\tan x + \cot x}dx = ($

A. Both A and R are true R is the correct explanatino of A

B. Both A and R are true but R is not correct explanation of A

C. A is true but R is false

D. A is false but R is true

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3. $A: \int_0^{100\pi} \sqrt{1-\cos 2x}dx = 200\sqrt{2}.$

If f(x) is a periodic function with period a then $\int_0^{na} f(x)dx = n\int_0^a f(x)dx$

A. Both A and R are true R is the correct explanatino of A

B. Both A and R are true but R is not correct explanation of A

C. A is true but R is false

D. A is false but R is true

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4. $A: \int_0^{\pi/2} \sin^7 x dx = \frac{16}{35}$

$R: \int_0^{\pi/2} \sin^n x dx = \frac{n-1}{n} \cdot \frac{n-3}{n-2} \cdot \frac{n-5}{n-4} \ldots\ldots\ldots \frac{2}{3}$.1 if n is odd.

A. Both A and R are true R is the correct explanatino of A

B. Both A and R are true but R is not correct explanation of A

C. A is true but R is false

D. A is false but R is true

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5. $A: \int_0^{\pi/4} \left(\tan^6 x + \tan^4 x\right) dx = \frac{1}{5}$

$R: \int_0^{\pi/4} \left(\tan^n x + \tan^{n-2} x\right) dx = \frac{1}{n-1}$

A. Both A and R are true R is the correct explanatino of A

B. Both A and R are true but R is not correct explanation of A

C. A is true but R is false

D. A is false but R is true

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6. Statement I : The value of the integral $\int_{\pi/6}^{\pi/3} \frac{dx}{1+\sqrt{\tan x}}$ is equal to $\frac{\pi}{6}$

Statement II : $\int_a^b f(x)dx = \int_a^b f(a+b-x)dx$

A. Both A and R are true R is the correct explanatino of A

B. Both A and R are true but R is not correct explanation of A

C. A is true but R is false

D. A is false but R is true

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7. A : The area of the region bounded by $y^2 = 4x, x^2 = 4y$ is $16/3$

R: The area of the region bounded by $y^2 = 4ax, x^2 = 4by$ is $16ab/3$

A. Both A and R are true R is the correct explanatino of A

B. Both A and R are true but R is not correct explanation of A

C. A is true but R is false

D. A is false but R is true

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8. A : The area of the ellipse $9x^2 + 4y^2 = 36$ is 6π sq. uint.

R: The area of the ellipse $x^2/a^2 + y^2/b^2 = 1$ is πab sq. unit.

A. Both A and R are true R is the correct explanatino of A

B. Both A and R are true but R is not correct explanation of A

C. A is true but R is false

D. A is false but R is true

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