MATHS

BOOKS - TARGET MATHS (HINGLISH)

DEFINITE INTEGRALS

Classical Thinking

1. $\int_1^e \frac{1}{x} dx$ is equal to

A. e

B. 0

C. 1

D. $\log(1+e)$

Answer: C

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2. $\int_1^3 (x-1)(x-2)(x-3)dx =$

A. 3

B. 2

C. 1

D. 0

Answer: D

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3. $\int_0^1 (1-x)^9 dx =$

A. 1

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

C. $\frac{11}{10}$

D. 2

Answer: B

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4. $\int_0^1 e^{2\log x} dx =$

A. 0

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

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

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

Answer: C

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

A. π

B. 0

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

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

Answer: B

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

A. -1

B. 1

C. 0

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

Answer: B

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

A. 0

B. 2

C. -2

D. 1

Answer: A

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

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

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

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

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

Answer: A

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9. $\int_{\pi/6}^{\pi/4} \cos ec2x dx =$

A. $\log 3$

B. $\log \sqrt{3}$

C. $\log 9$

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

Answer: D

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10. $\int_{1}^{e} \frac{1+\log x}{x} dx$

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

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

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

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

Answer: A

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11. Evaluate the following integral: $\int_1^2 \frac{1}{x^2} e^{-1/x} dx$

A. $\sqrt{e} + 1$

B. $\sqrt{e} - 1$

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

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

Answer: D

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12. $\int_1^2 \frac{\cos(\log x)}{x} dx =$

A. $\sin(\log 3)$

B. $\sin(\log 2)$

C. $\cos(\log 3)$

D. $\cos(\log 2)$

Answer: B

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

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

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

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

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

Answer: A

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

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

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

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

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

Answer: D

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

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

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

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

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

Answer: C

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

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

B. $\log 4$

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

D. $\log 2$

Answer: C

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

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

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

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

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

Answer: C

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

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

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

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

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

Answer: C

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19. $\int_0^a f(x)dx =$

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

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

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

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

Answer: D

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

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

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

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

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

Answer: C

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

A. 0

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

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

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

Answer: C

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

A. π

B. 0

C. 1

D. π^2

Answer: A

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23. The value of $\int_2^3 \frac{\sqrt{x}}{\sqrt{5-x}+\sqrt{x}} dx is$ __

A. 1

B. 0

C. -1

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

Answer: D

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

A. -2

B. -1

C. 0

D. 2

Answer: C

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25. $\int_{-1}^{1} \sin^{11} x dx$ is equal to

A. $\frac{10}{11}$

B. 2

C. 1

D. 0

Answer: D

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26. The value of $\int_{-\pi/2}^{\pi/2} \left(3\sin x + \sin^3 x\right) dx$ is

A. 3

B. 2

C. 0

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

Answer: C

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Critical Thinking

1. The value of $\int_{-2}^{2}(ax^3+bx+c)dx$ depends on

A. the value of a

B. the value of b

C. the value of c

D. the values of a and b

Answer: C

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2. Evaluate the definite integrals $\int_0^1 \frac{dx}{\sqrt{1+x}-\sqrt{x}}$

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

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

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

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

Answer: B

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3. $If I = \int_0^{\pi/4} \sin^2 x \quad dx$ and $J = \int_0^{\pi/4} \cos^2 x \quad dx.$ then

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

B. $2J$

C. J

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

Answer: A

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

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

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

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

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

Answer: A

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

A. 0

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

C. 2

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

Answer: C

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

A. 2

B. -2

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

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

Answer: A

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7. The value of $I = \int_0^{\frac{\pi}{2}} \frac{(\sin x + \cos x)^2}{\sqrt{1+\sin 2x}} dx$ is (A) 2 (B) 1 (C) 0 (D) 3

A. 3

B. 1

C. 2

D. 0

Answer: C

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

A. 0

B. 2

C. 8

D. 4

Answer: C

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9. Evaluate: $\int_{-1}^{3}\left(\frac{\tan^{-1}d}{x^2+1}+\frac{x^2+1}{x}\right)dx$

A. π

B. 2π

C. 3π

D. 0

Answer: B

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10. $\int_{0}^{\pi/4}\tan^6 x\sec^2 x dx =$

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

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

C. 1

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

Answer: A

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11. Find the value of the following: $\int_{\frac{\pi}{4}}^{\frac{\pi}{2}} \cos ec^2\theta \cos\theta d\theta$

A. $\sqrt{2}-1$

B. $1-\sqrt{2}$

C. $\sqrt{2}+1$

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

Answer: A

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

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

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

C. 2

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

Answer: B

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

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

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

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

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

Answer: C

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14. $\int_0^a x^2 \sin x^3 dx$ equals

A. $1 - \cos a^3$

B. $3(1 - \cos a^3)$

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

D. $\frac{1}{3}(1 - \cos a^3)$

Answer: D

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15. $\int_0^2 \frac{3^{\sqrt{x}}}{\sqrt{x}} dx$

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

B. 0

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

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

Answer: A

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16. 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

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17. 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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18. $\int_0^{\pi/2} \sec x \log(\sec x + \tan x) dx$ 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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19. The value of $\int_0^{-\pi/4} \frac{1+\tan x}{1-\tan x} dx$ is

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

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

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

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

Answer: A

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

A. 0

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

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

D. π

Answer: C

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21. $\int_0^{\pi/8} \cos^3 4\theta d\theta =$

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

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

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

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

Answer: D

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

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

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

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

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

Answer: B

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

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

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

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

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

Answer: D

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

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

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

C. π

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

Answer: C

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25. 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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26. Choose the correct answer $\int_0^{\frac{2}{3}} \frac{dx}{4+9x^2}$ (A) $\frac{\pi}{6}$ (B) $\frac{\pi}{12}$ (C) $\frac{\pi}{24}$ (D) $\frac{\pi}{4}$

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

B. $\frac{\pi}{24}$

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

D. 0

Answer: B

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

Answer: B

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

Answer: C

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

A. $\frac{\tan^{-1}(1-e)}{1+e}$

B. $\tan^{-1}\left(\frac{e-1}{e+1}\right)$

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

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

Answer: B

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

A. π

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

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

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

Answer: D

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

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

B. $2+\log_3\left(\frac{15}{7}\right)$

C. $2+\log_e 3-4\log_3 7+4\log_e 5$

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

Answer: B

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32. $\int_0^1 \frac{dx}{[ax+(1-x)b]^2}=$

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

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

C. ab

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

Answer: D

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

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

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

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

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

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

Answer: B

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35. Evaluate: $\int_0^{\pi/2} \frac{1}{\left(a^2\cos^2 x + b^2\sin^2 x\right)^2}dx$

A. πab

B. $\pi^2 ab$

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

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

Answer: D

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

A. $3+2\pi$

B. $4-\pi$

C. $2+\pi$

D. $4+\pi$

Answer: B

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

A. $\pi+2$

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

C. $\pi + 1$

D. $\pi - 2$

Answer: A

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38. $\int_3^4 \sqrt{\frac{x-3}{4-x}} dx =$

A. 0

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

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

D. π

Answer: C

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39. $\int_3^7 \sqrt{(x-3)(7-x)}dx =$

A. π

B. 0

C. 2π

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

Answer: C

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

A. $\left(\sqrt{2}_1\right)^2$

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

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

D. $\frac{6-2\sqrt{5}}{\sqrt{5}}$

Answer: D

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41. $\int_0^a \frac{x^4}{(a^2+x^2)^4} dx$

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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42. $\int_0^\pi \frac{dx}{1-2a\cos x+a^2}, a<1$ is equal to (A) $\frac{\pi a \log 2}{4}$ (B) $\frac{4\pi}{2-a^2}$ (C) $\frac{\pi}{1-a^2}$ (D) none of these

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

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

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

D. $2\pi(1-a^2)$

Answer: C

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43. The value of $\int_0^1 x^2 e^x dx$ is equal to

A. $e-2$

B. $e+2$

C. e^2-2

D. e^2

Answer: A

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44. $\int_{-\pi/4}^{\pi/2} e^{-x} \sin x \, dx$ is equal to

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

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

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

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

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

D. $\pi - \log 2$

Answer: A

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46. $\int_0^1 \cos^{-1} x dx =$

A. 0

B. 1

C. 2

D. -1

Answer: B

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47. $\int_0^{\pi^2/4} \sin \sqrt{x} dx$ equals to

A. 0

B. 1

C. 2

D. 4

Answer: C

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

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

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

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

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

Answer: A

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

A. $-\log 2$

B. $\log 2$

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

D. 0

Answer: C

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

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

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

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

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

Answer: D

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

A. $\alpha=e, \beta=-2$

B. $\alpha=3, \beta=2$

C. $\alpha=-3, \beta=2$

D. $\alpha=-e, \beta=-2$

Answer: A

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

A. e^e

B. $e^e - e$

C. $e^e + e$

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

Answer: A

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

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

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

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

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

Answer: C

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54. $\int_0^1 e^x \frac{x-1}{(x+1)^3} dx$

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

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

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

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

Answer: B

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55. If $x\left(x^4+1\right)\phi(x) = 1$, then $\int_1^2 \phi(x)dx =$

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

B. $\frac{1}{2}\log\frac{32}{17}$

C. $\frac{1}{4}\log\frac{16}{17}$

D. $\frac{1}{2}\log\frac{16}{17}$

Answer: A

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

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

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

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

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

Answer: A

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57. Evaluate the following :

$$\int_0^{\pi/4} \frac{\sec^2 x}{(1+\tan x)(2+\tan x)} dx$$

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

B. $\log_e 3$

C. $\frac{1}{2}\log_e\left(\frac{4}{3}\right)$

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

Answer: D

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58. Evaluate: $\int_0^{\frac{\pi}{4}} \frac{\sec x}{1+2\sin^2 x} dx$

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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59. For all values of , $\int_{1/e}^{\tan x}\frac{t}{1+t^2}dt+\int_{1/e}^{\tan x}\frac{dt}{t(t+t^2)}$ has the value

A. -1

B. 1

C. 0

D. 2

Answer: B

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60. Evaluate $\int_1^4 f(x)dx$, where $f(x) = \begin{cases} 4x+3 & \text{if} 1 \leq x \leq 2 \\ 3x+5 & \text{if} 2 \leq x \leq 4. \end{cases}$

A. 80

B. 20

C. 27

D. 37

Answer: D

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61. $\int_{-1}^{2} |x| dx =$

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

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

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

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

Answer: A

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62. $\int_0^3 |2-x|dx$ equals

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

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

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

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

Answer: B

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63. $\int_{-4}^{4} |x+2|dx$

A. 50

B. 24

C. 20

D. 30

Answer: C

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

A. 0

B. 1

C. 2

D. 4

Answer: D

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65. $\int_0^{2\pi} (\sin x + |\sin x|) dx =$

A. 0

B. 4

C. 8

D. 1

Answer: B

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

A. 0

B. 2

C. 1

D. -1

Answer: B

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67. If $[x]$ denotes the greatest integer less than or equal to x, then find the value of the integral $\int_0^2 x^2[x]dx$.

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

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

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

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

Answer: B

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

A. 2

B. -2

C. 0

D. 1

Answer: C

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69. $\int_0^{\frac{\pi}{2}} \log(\tan x) dx = 0$

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

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

C. $\pi \log_e 2$

D. 0

Answer: D

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70. The value of the integral $\int_0^{2a} \frac{f(x)}{f(x)+f(2a-x)}dx$ is equal to

A. a

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

C. $2a$

D. 0

Answer: A

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71. The value of $\int_0^{\pi/2} \frac{1000^{\sin x}}{1000^{\sin x}+1000^{\cos x}}dx$ is

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

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

C. π

D. 2π

Answer: A

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72. $\int_0^{\pi/2} \frac{e^{x^2}}{e^{x^2}+e^{\left(\frac{\pi}{2}-x\right)^2}}dx =$

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

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

C. $e^{\frac{\pi^2}{16}}$

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

Answer: A

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

A. 0

B. π

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

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

Answer: D

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74. The value of $\int_0^{\pi/2} \frac{dx}{1+\tan^3 x}$ is

A. 0

B. 1

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

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

Answer: D

Watch Video Solution

75. The value of $\int_0^{\pi} e^{\cos^2 x} \cos^5 3x dx$ is

A. 1

B. -1

C. 0

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

Answer: C

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76. The value of $\int_0^{\pi/2} lot\left(\frac{4+3\sin x}{4+3\cos x}\right) dx$ is

A. 2

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

C. 0

D. 1

Answer: C

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77. $\int_0^{\pi/2} \frac{d\theta}{1+\tan\theta} =$

A. π

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

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

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

Answer: D

Watch Video Solution

78. Evaluate the following :

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

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

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

C. 0

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

Answer: B

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

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

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

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

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

Answer: A

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

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

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

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

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

Answer: B

Watch Video Solution

81. The value of $\int_0^{\pi/4} \log(1+\tan\theta)d\theta$ is equal to

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

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

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

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

Answer: C

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

A. 1

B. 0

C. -1

D. 2

Answer: B

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

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

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

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

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

Answer: D

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84. Evaluate the following :

$\int_{\pi/6}^{\pi/3} \frac{1}{1 + \sqrt{\cot x}} dx$

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

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

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

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

Answer: C

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

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

D. $(a+b)\int_a^b f(x)dx$

Answer: B

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86. If $f(x) = f(2-x)$ then $\int_{0.5}^{1.5} xf(x)dx =$

A. $\int_0^1 f(x)dx$

B. $\int_{0.5}^{1.5} f(x)dx$

C. $2\int_{0.5}^{1.5} f(x)dx$

D. 0

Answer: B

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87. If : $\int_0^{2a} f(x)dx = 2.\int_0^a f(x)dx$, then :

A. $f(2a-x) = -f(x)$

B. $f(2a-x) = f(x)$

C. $f(a-x) = -f(x)$

D. $f(a-x) = f(x)$

Answer: B

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

A. π

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

C. 0

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

Answer: B

Watch Video Solution

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

A. π

B. 0

C. 2

D. 1

Answer: C

Watch Video Solution

90. The value of $\int_0^{2\pi} \cos^{99} x dx$ is

A. 1

B. -1

C. 99

D. 0

Answer: D

Watch Video Solution

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

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

B. $\pi \log_e 2$

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

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

Answer: A

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

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

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

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

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

Answer: D

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93. If $\int_{-1}^{1} f(x)dx = 0$ then

A. $f(-x) = f(x)$

B. $f(-x) = -f(x)$

C. $f(x) = 2f(x)$

D. $f(-x) = 2f(x)$

Answer: B

Watch Video Solution

94. 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

Watch Video Solution

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

A. 1

B. 0

C. 2

D. -2

Answer: B

Watch Video Solution

96. Evaluate :

$$\int_{-\frac{\pi}{2}}^{\frac{\pi}{2}} |\sin x| dx$$

A. 0

B. 2

C. -2

D. 1

Answer: B

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97. The value of $\int_{-a}^{a} \frac{1}{x + x^3} dx$ is

A. 0

B. $\int_{0}^{a} \frac{1}{1 + x^6} dx$

C. $2\int_0^a \frac{1}{1+x^3}dx$

D. $\int_0^a \frac{1}{1+(a-x)^3}dx$

Answer: A

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98. $\int_{-a}^{a} \sin x f(\cos x)dx =$

A. a

B. 0

C. 1

D. -1

Answer: B

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

A. $2e^{-1}$

B. 1

C. 0

D. -1

Answer: C

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

A. 0

B. 1

C. -1

D. 2

Answer: A

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

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

B. e^2-2e

C. 0

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

Answer: C

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

A. 2

B. 1

C. 0

D. -1

Answer: C

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103. $\int_{-1/2}^{1/2} (\cos x) \left[\log\left(\frac{1-x}{1+x}\right)\right] dx$ is equal to

A. 0

B. 1

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

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

Answer: A

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104. The value of $\int_{-\frac{\pi}{4}}^{\frac{\pi}{4}} \log(\sec\theta - \tan\theta)d\theta$ is

A. 0

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

C. π

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

Answer: A

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

A. 0

B. $\log 2$

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

D. 1

Answer: A

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106. $\int_{-\frac{\pi}{2}}^{\frac{\pi}{2}} \sin^2 x dx$

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

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

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

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

Answer: D

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

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

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

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

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

Answer: B

Watch Video Solution

108. $\int_{-1}^{1} \frac{1+x^3}{9-x^2} dx =$

A. $\log 2$

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

C. $\log 9$

D. $\frac{1}{3}\log 9$

Answer: B

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

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

B. π^2

C. 0

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

Answer: B

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

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

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

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

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

Answer: B

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111. Evaluate: $\int_0^{\pi/2} \sqrt{\cos\theta}\sin^3\theta dth\eta$

A. $\frac{20}{21}$

B. $\frac{8}{21}$

C. $\frac{-20}{21}$

D. $\frac{-8}{21}$

Answer: B

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112. If the value of the integral $I = \int_0^1 \frac{dx}{x + \sqrt{1 - x^2}}$ is equal to $\frac{\pi}{k}$, then the value of k is equal to

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

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

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

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

Answer: D

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113. Let $I_1 = \int_1^2 \frac{1}{\sqrt{1 + x^2}} dx$ and $I_2 = \int_1^2 \frac{1}{x} dx$.Then

A. $I_1 > I_2$

B. $I_2 > I_1$

C. $I_1 = I_2$

D. $I_1 > 2I_2$

Answer: B

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

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

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

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

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

Answer: B

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115. $\int_3^8 \frac{2-3x}{x\sqrt{1+x}} dx$ 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. $\log\left(\frac{3}{2e^3}\right)$

Answer: A

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Competitive Thinking

1. Which of the following is true?

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

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

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

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

Answer: A

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

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

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

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

D. π

Answer: C

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3. If $\int_0^{\pi/2} \log \cos x dx = \frac{\pi}{2} \log\left(\frac{1}{2}\right)$, then $\int_0^{\pi/2} \log \sec x dx =$

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

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

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

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

Answer: D

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4. 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. $\frac{1-p}{1+p}$

B. $1-p$

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

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

Answer: C

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5. $\int_{-\frac{\pi}{4}}^{\frac{\pi}{4}} \frac{dx}{1+\cos 2x}$ is

A. 4

B. 2

C. 0

D. 1

Answer: D

Watch Video Solution

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

A. -1

B. 1

C. 0

D. 2

Answer: C

Watch Video Solution

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

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

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

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

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

Answer: B

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

A. 2

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

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

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

Answer: B

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

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

B. π

C. 0

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

Answer: A

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

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

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

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

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

Answer: B

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11. $3a\int_0^1 \left(\frac{ax-1}{a-1}\right)^2 dx$ 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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12. $\int_0^{\pi/4} \sin(x - [x])d(x - [x])$ is equal to

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

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

C. 1

D. None of these

Answer: B

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13. The function $L(x) = \int_1^x \frac{dt}{t}$ satisfies the equation

A. $L(x + y) = L(x) + L(y)$

B. $L\left(\frac{x}{y}\right) = L(x) + L(y)$

C. $L(xy) = L(x) + L(y)$

D. None of these

Answer: C

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14. If $\int_a^b \{f(x) - 3x\}dx = a^2 - b^2$, then the value of $f\left(\frac{\pi}{6}\right)$, is

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

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

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

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

Answer: A

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15. 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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16.

$\int_0^{\pi/4} (\cos x - \sin x)dx + \int_{\pi/4}^{5\pi/4} (\sin x - \cos x)dx + \int_{2\pi}^{\pi/4} (\cos x - \sin x)$

is equal to

A. $\sqrt{2} - 2$

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

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

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

Answer: D

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17. Let $\frac{d}{dx}F(x)=\left(\frac{e^{\sin x}}{x}\right), x>0.$ If $\int_1^4 \frac{3}{x}e^s \in x^3 dx = F(k)-F(1),$ then one of the possible values of k, is: 15 (b) 16 (c) 63 (d) 64

A. 15

B. 64

C. 63

D. 16

Answer: B

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18. Suppose that F (x) is an antiderivative of $f(x) = \frac{\sin x}{x}, x > 0$, then $\int_1^3 \frac{\sin 2x}{x} dx$ can be expressed as

A. $F(6) - F(2)$

B. $\frac{1}{2}[F(6) - f(2)]$

C. $\frac{1}{p}[F(3) - F(1)]$

D. $2[F(6) - F(2)]$

Answer: A

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19. 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

Watch Video Solution

20. The value of the integral $\int_0^{\frac{\pi}{4}} \frac{\sqrt{\tan x}}{\sin x \cos x} dx$ equals

A. 1

B. 2

C. 0

D. 4

Answer: B

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21. If $I_n = \int_0^{\pi/4} \tan^n \theta \quad d\theta$, then $I_8 + I_6 =$

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

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

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

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

Answer: D

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22. If $g(1) = g(2)$, then $\int_1^2 [f\{g(x)\}]^{-1} f'\{g(x)\}g'(x)dx$ is equal to

A. 1

B. 2

C. 0

D. None of these

Answer: C

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23. If $\int_0^k \frac{dx}{2+18x^2} = \frac{\pi}{24}$, then the value of k is

A. 3

B. 4

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

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

Answer: C

Watch Video Solution

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

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

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

C. π

D. 0

Answer: A

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

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

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

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

D. 0

Answer: A

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

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

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

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

A. $\frac{22}{7} - \pi$

B. $\frac{2}{105}$

C. 0

D. $\frac{71}{15} - \frac{3\pi}{2}$

Answer: A

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

D. $\pi+1$

Answer: A

Watch Video Solution

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

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

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

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

D. π

Answer: D

Watch Video Solution

31. Evaluate the following :

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

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

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

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

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

Answer: D

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32. $\int_0^{1/2} \frac{dx}{(1+x^2)\sqrt{1-x^2}}$ is equal to

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

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

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

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

Answer: A

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

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

B. $\sqrt{3}\tan^{-1}(\sqrt{3})$

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

D. $2\sqrt{3}\tan^{-1}(\sqrt{3})$

Answer: C

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

A. 2π

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

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

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

Answer: D

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

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

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

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

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

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

Answer: C

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36. The value of the definite integral $\int_0^1 \left(\frac{1}{x^2+2x\cos\alpha+1}\right)dx$ for $0<\alpha<\pi$ is equal

A. $\sin\alpha$

B. $\tan^{-1}(\sin\alpha)$

C. $\alpha\sin\alpha$

D. $\frac{\alpha}{2}(\sin\alpha)^{-1}$

Answer: D

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

A. $\sqrt{2}\pi$

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

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

D. 2π

Answer: C

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38. If $\int_{\log 2}^{a} \frac{e^x}{\sqrt{e^x - 1}} dx = 2$ then $a =$

A. 0

B. $2 \log 2$

C. $\log 5$

D. $\log 2$

Answer: C

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39. 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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40. $The valueo \frac{f(\pi^2)}{1n3} \int_{\frac{7}{6}}^{\frac{5}{6}} \sec(\pi x) dx is \_\_$

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

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

C. π

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

Answer: C

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

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

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

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

D. π

Answer: B

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

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

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

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

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

Answer: B

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

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

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

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

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

Answer: B

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44. Evaluate : $\int_a^b \frac{\log x}{x} dx$.

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

B. $\log(ab)\log\left(\frac{b}{a}\right)$

C. $\frac{1}{2}\log(ab)\log\left(\frac{b}{a}\right)$

D. $\frac{1}{2}\log(ab)\log\left(\frac{a}{b}\right)$

Answer: C

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

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

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

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

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

Answer: B

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

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

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

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

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

Answer: B

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

A. $\frac{1}{2}+\frac{\sqrt{3}\pi}{12}$

B. $\frac{1}{2}-\frac{\sqrt{3}\pi}{12}$

C. $\frac{1}{2}+\frac{\sqrt{3\pi}}{12}$

D. None of these

Answer: B

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48. The value of $\int_{\pi/4}^{3\pi/4}\frac{x}{1+\sin x}\,dx$ .. . . . .

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

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

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

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

Answer: A

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

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

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

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

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

Answer: B

Watch Video Solution

50. $\int_0^{2x} d\frac{x}{2}.\sin\left(\frac{x}{2} + \frac{\pi}{4}\right)dx =$

A. 1

B. $2\sqrt{2}$

C. 0

D. None of these

Answer: C

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51. $I_{10} = \int_0^{\frac{\pi}{2}} x^{10} \sin x dx$ then $I_{10} + 90I_8$ is (A) $10\left(\frac{\pi}{2}\right)^6$ (B) $10\left(\frac{\pi}{2}\right)^9$ (C) $10\left(\frac{\pi}{2}\right)^8$ (D) $10\left(\frac{\pi}{2}\right)^7$

A. $10\left(\frac{\pi}{2}\right)^6$

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

C. $10\left(\frac{\pi}{2}\right)^7$

D. None of these

Answer: B

Watch Video Solution

52. If $\int_0^1 x \log\left(1+\frac{x}{2}\right) dx = a + b \log \frac{2}{3}$, then a and b are

A. $a = \frac{3}{2}, b = \frac{3}{2}$

B. $a = \frac{3}{4}, b = -\frac{3}{4}$

C. $a = \frac{3}{4}, b = \frac{3}{2}$

D. $a = b$

Answer: C

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53. If $I(m,n) = \int_0^1 t^m (1+t)^n . dt$, then the expression for I(m,n) in terms of I(m+1,n-1) is:

A. $\frac{2^n}{m+1} - \frac{n}{m+1} I(m+1, n-1)$

B. $\frac{n}{m+1} I(m+1, n-1)$

C. $\frac{2^n}{m+1} + \frac{n}{m+1} I(m+1, n-1)$

D. $\frac{m}{m+1} I(m+1, n-1)$

Answer: B

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54. The value of $\frac{(5050)\int_0^1 \left(1-x^{50}\right)^{100} dx}{\int_0^1 (1-x^{50})^{101} dx}$ is

A. 5049

B. 5051

C. 5050

D. None of these

Answer: B

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55. $\int_5^{10} \frac{1}{(x-1)(x-2)} dx$ is equal to

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

B. $\log\left(\frac{37}{32}\right)$

C. $\log\left(\frac{12}{7}\right)$

D. $\log\left(\frac{32}{27}\right)$

Answer: D

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56. The value of $\int_1^3 \frac{dx}{x(1+x^2)}$ is

A. $\frac{1}{2}\log\left(\frac{9}{5}\right)$

B. $\frac{1}{2}\log\left(\frac{5}{9}\right)$

C. $\frac{1}{2}\log\left(\frac{4}{9}\right)$

D. $\frac{1}{2}\log\left(\frac{9}{4}\right)$

Answer: A

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

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

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

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

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

Answer: B

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58. Evaluate $\int_0^{\pi/4} \frac{\sin x + \cos x}{9 + 16\sin 2x}dx.$

A. $\frac{1}{20}\log 3$

B. $\log 3$

C. $\frac{1}{20}\log 5$

D. None of these

Answer: A

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59. the value of integral $\int_0^2 \frac{\log\left(x^2+2\right)}{(x+2)^2}dx$ is

A. $\left(\sqrt{2}\right)3\tan^{-1}\sqrt{2}+\frac{5}{12}\log 2-\frac{1}{4}\log 3$

B. $\frac{\sqrt{2}}{3}\tan^{-1}\sqrt{2}-\frac{5}{12}\log 2-\frac{1}{12}\log 3$

C. $\frac{\sqrt{2}}{3}\tan^{-1}\sqrt{2}+\frac{5}{12}\log 2+\frac{1}{4}\log 3$

D. $\frac{\sqrt{2}}{3}\tan^{-1}\sqrt{2}-\frac{5}{12}\log 2+\frac{1}{12}\log 3$

Answer: D

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

A. $\int_0^{\frac{\pi}{6}} \frac{x dx}{\tan x}$

B. $\int_0^{\frac{\pi}{6}} \frac{2x}{\tan x} dx$

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

D. $\int_0^{\frac{\pi}{6}} \frac{x dx}{\sin x}$

Answer: A

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61. 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. $I_1 > I_2$

C. $I_1 < I_2$

D. None of these

Answer: A

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62. 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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63. 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. 1

B. 2

C. 3

D. 5

Answer: D

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

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

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

C. $g(x)g(\pi)$

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

Answer: A

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65. if $f(x) = |x - 1|$ then $\int_0^2 f(x)dx$ is

A. 1

B. 0

C. 2

D. -2

Answer: A

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66. $\int_{-5}^{5} |x + 2|dx$

A. 29

B. 28

C. 27

D. 30

Answer: A

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67. If $f(x) = \int_{-1}^{x} |t| dt$, then for any $x \geq 0$, $f(x)$ is equal to

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

B. $1 - x^2$

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

D. $1 + x^2$

Answer: C

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68. $\int_{0}^{1} |3x - 1| dx =$

A. 0

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

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

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

Answer: B

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69. $\int_{-2}^{2} \left|1 - x^2\right| dx =$ (A) 4 (B) 2 (C) -2 (D) 0

A. 2

B. 4

C. 6

D. 8

Answer: B

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

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

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

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

D. None of these

Answer: C

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71. $\int_0^{100\pi} |\cos x| dx = \ldots\ldots\ldots\ldots\ldots\ldots$

A. 200

B. 100

C. 50

D. 0

Answer: A

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72. $\int_0^{\pi/2} |\sin x - \cos x| dx =$

A. 0

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

C. $\sqrt{2}-1$

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

Answer: B

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73. The integral $\int_0^{\pi} \sqrt{1+4\sin^2\frac{x}{2}-4\sin\frac{x}{2}}$ dx is equal to

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

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

C. $\pi - 4$

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

Answer: B

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74. If $I = \int_{\frac{1}{e}}^{e} |\log x| \frac{dx}{x^2}$,then I equals (A) 2 (B) $\frac{2}{e}$ (C) $2\left(1 - \frac{1}{e}\right)$ (D) 0

A. 2

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

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

D. 0

Answer: C

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75. $\int_0^3 [x]dx =$ _____ where [x] is greatest integer function

A. 3

B. 0

C. 2

D. 1

Answer: A

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76. Let $f(x) = x - [x]$, for every real number x, where [x] is integral part of x. Then $\int_{-1}^{1} f(x)dx$ is

A. 1

B. 2

C. 0

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

Answer: A

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77. The integral $\int_0^{1.5} [x^2]dx, where[.]$ denotoes the greatest integer function, equals .....

A. $2+\sqrt{2}$

B. $2-\sqrt{2}$

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

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

Answer: B

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78. The value of $\int_0^9 [\sqrt{x}+2]\,dx$, where $[.]$ is the greatest integer function.

A. 31

B. 22

C. 23

D. None of these

Answer: A

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79. If for all real numbers y, $[y]$ is the greatest integer less than or equal to y, then the value of the integral $\int_{\pi/2}^{3\pi/2} [2s \in x]dx$ is $-\pi$ b. 0 c. $\pi/2$ d. $\pi/2$

A. $-\pi$

B. 0

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

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

Answer: C

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

(where $[t] =$ greatest integer less or equal to t)

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

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

C. $\frac{\pi^2}{8} - 1$

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

Answer: D

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81. The value of $\int_1^a [x]f'(x)dx$, where $a > 1$, and $[x]$ denotes the greatest integer not exceeding x is

A. $af(a) - \{f(1) + f(2) + \ldots . + f([a])\}$

B. $[a]f(a) - \{f(1) + f(2) + \ldots \ldots . + f([a])\}$

C. $[a]f([a]) - \{f(1) + f(2) + \ldots \ldots \ldots \ldots + f(a)\}$

D. $af([a]) - \{f(1) + f(2) + \ldots \ldots \ldots \ldots + f(a)\}$

Answer: B

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82. If $[x]$ denotes the greatest integer less than or equal to x then the value of $\int_0^2 (|x-2| + [x])dx$ is equal to

A. 2

B. 3

C. 1

D. 4

Answer: B

Watch Video Solution

83. $\int_{-2}^{2}[x]dx$

A. 1

B. 2

C. 3

D. 4

Answer: D

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84. If [x] dentoes the greatest integer less than or equal to x, then the value of $\int_0^5 [|x-3|]dx$ is

A. 1

B. 2

C. 4

D. 8

Answer: B

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85. $\int_0^{11} \frac{(11-x)^2}{x^2+(11-x)^2}dx =$

A. 2

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

C. 4

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

Answer: B

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

A. 0

B. $-\pi$

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

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

Answer: D

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87. $\int_0^{\frac{\pi}{2}} \frac{\sin^{1000} x dx}{\sin^{1000} x + \cos^{1000} x}$ is equal to

A. 1

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

C. 1000

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

Answer: B

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88. $\int_0^{\frac{\pi}{2}} \frac{\tan^7 x}{\cot^7 x + \tan^7 x} dx$ is equal to

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

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

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

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

Answer: B

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89. The value of the integral $\int_0^{\pi/2} \frac{\sqrt{\cot x}}{\sqrt{\cot x}+\sqrt{\tan x}}dx$ is

A. π

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

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

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

Answer: C

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90. $\int_0^{\pi/2} \frac{\sqrt[n]{\sec x}}{\sqrt[n]{\sec x}+\sqrt[n]{\text{cosec } x}}dx =$

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

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

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

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

Answer: C

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91. Evaluate the following :

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

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

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

C. π

D. 2π

Answer: A

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92. $\int_0^{\frac{\pi}{2}} \frac{dx}{1+(\tan x)^{\sqrt{2018}}} =$

A. π

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

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

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

Answer: D

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93. 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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94. $\int_0^{\frac{\pi}{2}} \frac{2008^{\sin x}}{2008^{\sin x} + 2008^{\cos x}} dx =$

A. 0

B. π

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

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

Answer: C

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

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

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

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

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

Answer: B

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

A. 1

B. 0

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

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

Answer: B

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97. If $\int_0^{\frac{\pi}{2}} \log(\cos x)dx = -\frac{\pi}{2}\log 2$, then $\int_0^{\frac{\pi}{2}} \log(\cos ecx)dx =$

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

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

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

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

Answer: C

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

A. π

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

C. 0

D. 2π

Answer: C

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99. $\int_0^{\frac{\alpha}{3}} \frac{f(x)}{f(x)+f\left(\frac{\alpha-3x}{3}\right)}dx =$

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

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

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

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

Answer: D

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100. Let f be a non constant continuous function for all $x \geq 0$. Let f satisfy the relation $f(x)f(a-x)=1$ for some $a \in R^+$. Then

$I = \int_0^a \frac{dx}{1 + f(x)}$ is equal to

A. a

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

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

D. $f(a)$

Answer: C

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

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

B. π

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

D. $\pi \log 2$

Answer: B

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

A. $\frac{\pi^2}{12}$

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

C. $\frac{\pi^2}{6}$

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

Answer: A

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103. $\int_0^{\pi} \frac{n\tan x}{\sec x + \cos x} dx$

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

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

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

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

Answer: A

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

A. 0

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

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

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

Answer: D

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

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

B. $\pi \log 2$

C. $\log 2$

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

Answer: D

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

A. $\pi \log 2$

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

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

D. $\log 2$

Answer: A

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

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

B. 1

C. -1

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

Answer: D

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108. $\int_2^8 \frac{\sqrt{10-x}}{\sqrt{x}+\sqrt{10-x}} dx$

A. 0

B. 3

C. 10

D. 8

Answer: B

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109. $\int_{2016}^{2017} \frac{\sqrt{x}}{\sqrt{x}+\sqrt{4033-x}} dx$ is equal to

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

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

C. $\frac{2017}{2}$

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

Answer: D

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

A. -1

B. -2

C. 2

D. 4

Answer: C

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111. 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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112. The value of $\int_{-\pi/2}^{\pi/2} \frac{1}{e^{\sin x}+1} dx$ is equal to

A. 0

B. 1

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

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

Answer: D

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113. The value of $\int_{\sqrt{\ln 2}}^{\sqrt{\ln 3}} \frac{x \sin x^2}{\sin x^2 + \sin(In6 - x^2)} dx$, is

A. $\frac{1}{4}\log\frac{3}{2}$

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

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

D. $\frac{1}{6}\log\frac{3}{2}$

Answer: A

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114. The value of the integral $I = \int_{1/2014}^{2014} \frac{\tan^{-1} x}{x} dx$ is

A. $\frac{\pi}{4}\log 2014$

B. $\frac{\pi}{2}\log 2014$

C. $\pi \log 2014$

D. $\frac{1}{2}\log 2014$

Answer: B

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115. The value of the definite integral $\frac{1}{\pi}\int_{\frac{\pi}{2}}^{\frac{5\pi}{2}} \frac{e^{\tan^{-1}(\sin x)}}{e^{\tan^{-1}(\sin x)}+e^{\tan^{-1}(\cos x)}}dx$ is

A. 1

B. π

C. e

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

Answer: B

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116. If $f(x) = f(\pi + e - x)$ and $\int_e^{\pi} f(x)dx = \frac{2}{e+\pi}$, then $\int_e^{\pi} xf(x)dx$ is equal to

A. $\pi - e$

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

C. 1

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

Answer: C

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117. The value of $\int_{\pi/4}^{3\pi/4} \frac{\phi}{1+\sin\phi} d\phi$ is

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

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

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

D. None of these

Answer: A

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118. Let $I_1 = \int_a^{\pi - a} x f(\sin x) dx$, $I_2 = \int_a^{\pi - a} f(\sin x) dx$, then I_2 is equal to

A. $\frac{\pi}{2} I_1$

B. πI_1

C. $\frac{2}{\pi} I_1$

D. $2I_1$

Answer: C

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119. If $f(x) = \frac{e^2}{1+e^x}$, $I_1 = \int_{f(-a)}^{f(a)} xg\{x(1-x)\}dx$ and $I_2 = \int_{f(-a)}^{f(a)} g\{x(1-x)\}dx$, where g is not identify function. Then the value of I_2 / I_1, is

A. 1

B. -3

C. -1

D. 2

Answer: D

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120. Q. $\int_0^{\pi} \left(e^{\cos^2 x}\left(\cos^3(2n+1)x dx, n \in I\right.\right.$

A. x

B. 1

C. 0

D. None of these

Answer: C

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121. $\int_0^{\pi} x f(\sin x) dx$ is equal to

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

B. $\pi \int_0^{\pi} f(six) dx$

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

D. $\pi \int_0^{\frac{\pi}{2}} f(\cos x) dx$

Answer: D

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122. If $I_1 = \int_0^{\pi/2} f(\sin 2x)\sin x\,dx$ and $I_2 = \int_0^{\pi/4} f(\cos 2x)\cos x\,dx$, then I_1 / I_2 is equal to

A. 1

B. 2

C. $1/\sqrt{2}$

D. $\sqrt{2}$

Answer: D

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123. Evaluate: $\int_0^{100\pi} \sqrt{(1-\cos 2x)}dx$.

A. $I = 0$

B. $I = 200\sqrt{2}$

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

D. $I = 100$

Answer: B

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

A. 0

B. 1

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

D. 2

Answer: A

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125. The value of $\frac{\int_{\frac{-\pi}{4}}^{\frac{\pi}{4}} \sin^{103} x . \cos^{101} x dx}{}$ is

A. $\left(\frac{\pi}{4}\right)^{101}$

B. 0

C. $\left(\frac{\pi}{4}\right)^{103}$

D. 2

Answer: B

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126. The value of $\int_{-2}^{2}(x\cos x+\sin x+1)dx$ is

A. 2

B. 0

C. -2

D. 4

Answer: D

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127. $\int_4^4 \log\left(\frac{9-x}{9+x}\right)dx$ equals

A. 4

B. -4

C. 8

D. 0

Answer: D

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128. Evaluate the following :

$$\int_{-\pi/2}^{\pi/2} \log\left(\frac{2-\sin x}{2+\sin x}\right)dx$$

A. 1

B. 3

C. 2

D. 0

Answer: D

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

A. p

B. q

C. s

D. p and s

Answer: D

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130. 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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131. $\int_{-2}^{0} \{x^3 + 3x^2 + 3x + 3 + (x+1)\cos(x+1)dxisequa < o - 4$ (b) 0 (c) 4 (d) 6

A. 2

B. 4

C. 0

D. 8

Answer: B

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

A. 0

B. 1

C. 2

D. 4

Answer: D

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134. $\int_{-2}^{2} |x \cos \pi x| dx$ 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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135. $\int_0^1 x \tan^{-1} x \quad dx =$

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

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

C. $\pi - 1$

D. 0

Answer: A

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

A. π

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

C. 0

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

Answer: D

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137. The value of $\int_{-\pi/2}^{\pi/2} \frac{\sin^2 x}{1+2^x}$ dx is

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

B. 4π

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

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

Answer: C

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138. Evaluate: $\int_{-1}^{1} \frac{\sin x - x^2}{3 - |x|} dx$

A. 0

B. $2\int_{0}^{1} \frac{\sin x}{3 - |x|} dx$

C. $2\int_{0}^{1} \frac{\sin - x^2}{3 - |x|} dx$

D. $2\int_{0}^{1} \frac{\sin x - x^2}{3 - |x|} dx$

Answer: C

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139. The value of integral $\int_{-\pi}^{\pi} (\cos ax - \sin bx)^2 dx$, where (a and b are integers), is

A. $-\pi$

B. 0

C. π

D. 2π

Answer: D

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140. $\int_{-\frac{3\pi}{2}}^{-\frac{\pi}{2}} \left\{(\pi+x)^3+\cos^2(x+3\pi)\right\}dx$ is equal to (A) $\frac{\pi}{4}-1$ (B) $\frac{\pi^4}{32}$ (C) $\frac{\pi^4}{32}+\frac{\pi}{2}$ (D) $\frac{\pi}{2}$

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

B. $\frac{\pi^4}{32}+\frac{\pi}{2}$

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

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

Answer: C

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141. The value of the integral $\int_{-\pi/2}^{\pi/2}\left(x^2+\log\frac{\pi-x}{\pi+x}\right)\cos x\,dx$

A. 0

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

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

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

Answer: B

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142. Evaluate: $\int_{\pi/4}^{\pi/4}\frac{x+\pi/4}{2-\cos 2x}dx$

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

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

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

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

Answer: D

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143. Let $p(x)$ be a function defined on R such that $\lim_{x \to \infty} \frac{f(3x)}{f(x)} = 1, p'(x) = p'(1-x), \text{for all} x \in [0,1], p(0) = 1$ and $p(1)$ equals

A. $\sqrt{41}$

B. 21

C. 41

D. 42

Answer: B

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

A. 0

B. 1

C. 2

D. 4

Answer: A

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145. The value of $\int_0^{\sin^2 x} \sin^{-1}\sqrt{t}dt + \int_0^{\cos^2 x} \cos^{-1}\sqrt{t}dt$ is

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

B. 1

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

D. None of these

Answer: C

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146. If $M = \int_0^{\frac{\pi}{2}} \frac{\cos x}{x+2} dx$ and $N = \int_0^{\frac{\pi}{4}} \frac{\sin x \cos x}{(x+1)^2} dx$, then the value of $M - N$ is

A. π

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

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

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

Answer: D

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147. If for nonzero x, $af(x) + bf\left(\frac{1}{x}\right) = \frac{1}{x} - 5$, where $a \neq b$ then $\int_1^2 f(x)dx = 1$__

A. $\frac{1}{(a^2+b^2)}\left[a\log 2 - 5a\frac{7}{2}b\right]$

B. $\frac{1}{(a^2-b^2)}\left[a\log 2 - 5a + \frac{7}{2}b\right]$

C. $\frac{1}{(a^2-b^2)}\left[a\log - 5a - \frac{7}{2}b\right]$

D. $\frac{1}{(a^2+b^2)}\left[a\log 2 - 5a - \frac{7}{2}b\right]$

Answer: B

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148. Let f be the function defined on $[-\pi, \pi]$ given by $f(0) = 9$ and $f(x) = \frac{\sin\left(\frac{9x}{2}\right)}{\sin\left(\frac{x}{2}\right)}$ for $x \neq 0$. The value of $\frac{2}{\pi}\int_{-\pi}^{\pi} f(x)dx$ is (asked as Match the following question)

A. 0

B. 2

C. 4

D. 6

Answer: C

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Evaluatio Test

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

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

B. $\frac{\pi}{8}\log\frac{1}{2}$

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

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

Answer: A

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2. For every integer n, $\int_n^{n+1} f(x)dx = n^2$, then the value of $\int_0^5 f(x)dx =$

A. 20

B. 25

C. 30

D. 35

Answer: C

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3. If $f(x) + f(3-x) = 0$,then $\int_0^3 \frac{1}{1+2^{f(x)}}dx =$

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

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

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

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

Answer: B

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

A. 7

B. 0

C. $5 \log 13$

D. $2 \log 5$

Answer: B

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5. Let $I = \int_0^n [x]dx, n > 0,$ where [ ] is G.I.F.,

A. n

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

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

D. None of these

Answer: C

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6. If $I_n = \int_0^{\frac{\pi}{2}} \frac{\sin^2 nx}{\sin^2 x} dx$, then

A. A.P.

B. G.P.

C. H.P.

D. None of these

Answer: A

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7. The value of the integral $\int_{\alpha}^{\beta} \frac{1}{\sqrt{(x-\alpha)(\beta-x)}} dx$

A. π

B. 2π

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

D. None of these

Answer: A

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8. Let $f(x) = \frac{e^x + 1}{e^x - 1}$ and $\int_0^1 x^3 . \frac{e^x + 1}{e^x - 1} dx = \alpha$ Then, $\int_{-1}^{1} t^3 f(t) dt$ is equal to

A. 0

B. α

C. 2α

D. None of these

Answer: C

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9. If m and n are positive integers and $f(m,n)=\int_0^1 x^{n-1}(\log x)^m dx$, then $f(m,n)$ is equal to

A. $\frac{m}{n}f(m-1,n)$

B. $-\frac{m}{n}f(m-1,n)$

C. $\frac{n}{m}f(m-1,n)$

D. None of these

Answer: B

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10. The least value of the function $\phi(x) = \int_{\frac{7\pi}{6}}^{x} (4\sin t + 3\cos t)dt$ on the interval $\left[\frac{7\pi}{6}, \frac{4\pi}{3}\right]$ is

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

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

C. $\frac{7\left(1-\sqrt{3}\right)}{2}$

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

Answer: C

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11. Prove that $\int_a^b f(x)dx = (b-a)\int_0^1 f((b-a)x + a)dx$

A. $a - b$

B. $b - a$

C. $a + b$

D. None of these

Answer: B

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12. The integral $\int_0^{1.5} [x^2] dx, where [.]$ denotoes the greatest integer function, equals .....

A. $\sqrt{2} - 2$

B. $2 - \sqrt{2}$

C. $2 + \sqrt{2}$

D. None of these

Answer: B

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13. If $f(x)$ is a function satisfying $f\left(\frac{1}{x}\right) + x^2 f(x) = 0$ for all non zero x then $\int_{\cos\theta}^{\sec\theta} f(x)dx =$

A. $\cos\theta + \sec\theta$

B. $\cos^2\theta$

C. $\sec^2\theta$

D. 0

Answer: D

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14.

$$\lim_{n\to\infty} \frac{1}{n}\left[1 + \sqrt{\frac{n}{n+1}} + \sqrt{\frac{n}{n+2}} + \sqrt{\frac{n}{n+3}} + \ldots\ldots\ldots + \sqrt{\frac{1}{n+3(}}\right.$$

A. $2\sqrt{2}$

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

C. 2

D. 4

Answer: C

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15. $\lim_{n\to\infty}\sum_{n=1}^{n}\frac{\sqrt{n}}{\sqrt{r}\left(3\sqrt{r}+4\sqrt{n}\right)^{2}}$

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

B. $\frac{1}{14}$

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

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

Answer: C

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16. 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. $\frac{1}{4}(e-7)$

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

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

D. $3 - \frac{1}{2}e^2 - \frac{3}{2}$

Answer: D

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17. $\int_0^{100\pi} \left(\left|\sin^3 x\right| + \left|\cos^3 x\right|\right)dx =$

A. 400

B. 800

C. $\frac{800}{3}$

D. None of these

Answer: C

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18.

$I_1 = \int_0^{\frac{\pi}{2}} \frac{\sin x - \cos x}{1 + \sin x \cos x} dx, I_2 = \int_0^{2\pi} \cos^6 x dx, I_3 = \int_{\frac{\pi}{2}}^{\frac{\pi}{2}} \sin^3 x dx, I_4 =$

$I_2 = I_3 = I_4 = 0, I_1 \neq 0$ $I_1 = I_2 = I_3 = 0, I_4 \neq 0$

$I_1 = I_2 = I_3 = 0, I_4 \neq 0$ $I_1 = I_2 = I_3 = 0, I_4 \neq 0$

A. $I_1 = I_2 = I_3 = I_4 = 0$

B. $I_1 = I_2 = I_3 = 0$ but $I_4 \neq 0$

C. $I_1 = I_3 = I_4 =$ but $I_2 \neq 0$

D. $I_1 = I_2 = I_4 = 0$ but $I_3 \neq 0$

Answer: C

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19. $\int_0^{2\pi} \frac{x \sin^{2n} x}{\sin^{2n} x + \cos^{2n} x} dx, n > 0$, is equal to

A. π

B. 2π

C. π^2

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

Answer: C

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20. The equation $\int_{-\frac{\pi}{4}}^{\frac{\pi}{4}} \left\{ a|\sin x| + \frac{b \sin x}{1 + \cos^2 x} + c \right\} dx = 0$ where a, b, c are constants gives a relation between

A. a,b and c

B. a and c

C. a and b

D. b and c

Answer: B

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21. $\int_0^{\sqrt{\log\frac{\pi}{2}}} \cos\left(e^{x^2}\right) 2xe^{x^2} dx =$

A. 1

B. $1 + \sin 1$

C. $1 - \sin 1$

D. $\sin 1 - 1$

Answer: C

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22. If $f(x) = \int_0^x \sin^6 t dt$, then $f(x+\pi) =$

A. $f(x) + f(\pi)$

B. $f(x) - f(\pi)$

C. $f(x)f(\pi)$

D. $\frac{f(x)}{f(\pi)}$

Answer: A

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23. If $f(x)$ is a polynomial of degree 2, such that $f(0) = 3, f'(0) = -7, f''(0) = 8 \int_1^2 f(x)dx =$

A. $\frac{11}{6}$

B. $\frac{13}{6}$

C. $\frac{17}{6}$

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

Answer: A

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24. If $f(x) = A\sin\left(\frac{\pi x}{2}\right) + B$, $f'\left(\frac{1}{2}\right) = \sqrt{2}$ and $\int_0^1 f(x)dx = \frac{2A}{\pi}$ then constants A and B are

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

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

C. $\frac{4}{\pi}$ and 0

D. 0 and $-\frac{4}{\pi}$

Answer: C

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25. 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. 0

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

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

Answer: D

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26. If a is a positive integer, then the number of values of a satisfying $\int_0^{\frac{\pi}{2}} \left\{ a^2 \left(\cos 3\frac{x}{4} + \frac{3}{4}\cos x \right) + a\sin x - 20\cos x \right\} dx \leq \frac{a^2}{3}$ is:

A. 1

B. 2

C. 7

D. 4

Answer: D

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27. If for all real numbers y, $[y]$ is the greatest integer less than or equal to y, then the value of the integral $\int_{\pi/2}^{3\pi/2} [2s \in x]dx$ is $-\pi$ b. 0 c. $\pi/2$ d. $\pi/2$

A. $-\pi$

B. 0

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

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

Answer: C

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28. Let f(x) = $\begin{vmatrix} \sec x & \cos x & \sec^2 x + \cot x \cos ecx \\ \cos^2 x & \cos^2 x & \cos ec^2 x \\ 1 & \cos^2 x & \cos^2 x \end{vmatrix}$ then find the value of $f_0^{\pi/2}$ f(x) dx.

A. $\frac{\pi}{4} + \frac{8}{15}$

B. $\frac{\pi}{4} - \frac{8}{15}$

C. $-\frac{\pi}{4} - \frac{8}{15}$

D. $-\frac{\pi}{4} + \frac{8}{15}$

Answer: C

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29. If $\frac{1}{\sqrt{a}} \int_1^a \left(\frac{3}{2}\sqrt{x} + 1 - \frac{1}{\sqrt{x}} \right) dx < 4$ then 'a' may take values :

A. 0

B. 4

C. 9

D. None of these

Answer: D

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30. Let $\frac{d}{dx}F(x) = \left(\frac{e^{\sin x}}{x}\right), x > 0.$ If $\int_1^4 \frac{3}{x}e^s \in x^3 dx = F(k) - F(1),$ then one of the possible values of k, is: 15 (b) 16 (c) 63 (d) 64

A. 15

B. 16

C. 63

D. 64

Answer: D

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