MATHS

BOOKS - MHTCET PREVIOUS YEAR PAPERS AND PRACTICE PAPERS

INTEGRATION

Practice Exercise Exercise 1 Topical Problems

1. If $f'(x) = x + \frac{1}{x}$, then the value of f(x) is

A. $x^2 + \log x + C$

B. $\frac{x^2}{2} + \log|x| + C$

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

D. None of these

Answer: B

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2. The anti-derivative of $\sin 2x - 4e^{3x}$ is

A. $\frac{1}{2}\cos 2x - \frac{4}{3}e^{3x} + C$

B. $-\frac{1}{2}\cos 2x + \frac{4}{3}e^{3x} + C$

C. $-\frac{1}{2}\cos 2x - \frac{4}{3}e^{3x} + C$

D. None of these

Answer: C

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3. $\int\left(\frac{1}{\sqrt{9-25x^2}}\right)$ dx

A. $\sin^{-1}\left(\frac{5x}{3}\right)+C$

B. $\frac{3}{2}\sin^{-1}\left(\frac{5x}{3}\right)+C$

C. $\frac{1}{5}\sin^{-1}\left(\frac{5x}{3}\right)+C$

D. None of these

Answer: C

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

A. $\frac{1}{2}\log\left|x+\sqrt{2x^2+1}\right|+C$

B. $\frac{1}{2}\log\left|2x+\sqrt{4x^2+1}\right|+C$

C. $\log\left|2x+\sqrt{4x^2+1}\right|+C$

D. None of these

Answer: B

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5. $\int \sin^3 x \cos^3 x dx$ is equal to

A. $\frac{1}{32}\left[-\frac{3}{2}\cos 2x + \frac{1}{6}\cos 6x\right] + C$

B. $\frac{1}{16}\left[-\frac{3}{2}\cos 2x + \frac{1}{6}\cos 6x\right] + C$

C. $\frac{1}{64}\left[-\frac{3}{2}\cos 2x + \frac{1}{6}\cos 6x\right] + C$

D. None of the above

Answer: A

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6. $\int \frac{e^{6\log x} - e^{5\log x}}{e^{4\log x} - e^{3\log x}} dx$

A. $\frac{x}{2} + C$

B. $\frac{x^2}{2} + C$

C. $\frac{x^3}{3} + C$

D. $\frac{x^4}{2} + C$

Answer: C

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7. $\int \frac{\sin x}{\sin x - a} dx$ is equal to

A. $x + \sin a \cos a \log|\sin(x - a)| + C$

B. $(\cos a)x + \sin a \log|\sin(x - a)| + C$

C. $(\sin a)x + \cos a \log|\sin(x - a)| + C$

D. None of the above

Answer: B

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8. $\int (1-\cos x)\cos ec^2 x dx$ is equal to

A. $\tan x + C$

B. $\tan. \frac{x}{2} + C$

C. $\frac{1}{2}\tan. \frac{x}{2} + C$

D. None of these

Answer: B

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9. $\int x\sqrt{x+2}dx$ is equal to

A. $\frac{2}{5}(x+2)^{5/2} - \frac{4}{3}(x+2)^{3/2} + C$

B. $\frac{1}{5}(x+2)^{5/2} - \frac{4}{3}(x+2)^{3/2} + C$

C. $\frac{2}{5}(x+2)^{5/2} - \frac{2}{3}(x+2)^{3/2} + C$

D. None of these

Answer: A

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10. If the primitive of $\frac{1}{f(x)}$ is equal to $\log\{f(x)\}^2 + C$, then f(x) is

A. $x + d$

B. $\frac{x}{2} + d$

C. $\frac{x^2}{2} + d$

D. $x^2 + d$

Answer: B

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11. $\int \frac{1}{\sqrt{9x-4x^2}}dx$ is equal to

A. $\frac{1}{9}\sin^{-1}\left(\frac{9x-8}{8}\right)+C$

B. $\frac{1}{2}\sin^{-1}\left(\frac{8x-9}{9}\right)+C$

C. $\frac{1}{3}\sin^{-1}\left(\frac{9x-8}{8}\right)+C$

D. $\frac{1}{2}\sin^{-1}\left(\frac{9x-8}{9}\right)+C$

Answer: B

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12. $\int \frac{1}{\sqrt{8+3x-n^2}}dx$

A. $\frac{2}{3}\sin^{-1}\left(\frac{2x-1}{\sqrt{41}}\right)+C$

B. $\frac{3}{2}\sin^{-1}\left(\frac{2x-3}{\sqrt{41}}\right)+C$

C. $\frac{1}{\sqrt{41}}\sin^{-1}\left(\frac{2x-3}{\sqrt{41}}\right)+C$

D. $\sin^{-1}\left(\frac{2x-3}{\sqrt{41}}\right)+C$

Answer: D

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13. $\int\sqrt{1+\cos x}dx$ is equal to

A. $2\sqrt{2}\cos.\frac{x}{2}+C$

B. $2\sqrt{2}\sin.\frac{x}{2}+C$

C. $\sqrt{2}\cos.\frac{x}{2}+C$

D. $\sqrt{2}\sin.\frac{x}{2}+C$

Answer: B

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14. If $\left(d\frac{f(x)}{dx} = \frac{1}{1+x^2}\right.$ then $\frac{d}{dx}\{f(x^3)\}$ is

A. $\frac{3x}{1+x^3}$

B. $\frac{3x^2}{1+x^6}$

C. $\frac{-6x^5}{(1+x^6)^2}$

D. $\frac{-6x^5}{1+x^6}$

Answer: B

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15. $\int (x+1)(x+2)^7(x+3)dx$ is equal to

A. $\frac{(x+2)^{10}}{10} - \left((x+2)^8\right) + C$

B. $\frac{(x+1)^2}{2} - \frac{(x+2)^8}{8} - \frac{(x+3)^2}{2} + C$

C. $\frac{(x+2)^{10}}{10} + C$

D. $\frac{(x+1)^2}{2} + \frac{(x+2)^8}{8} + \frac{(x+3)^2}{2} + C$

Answer: A

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16. What is $\int \frac{x^4 - 1}{x^2\sqrt{x^4 + x^2 + 1}} dx$ equal to ?

A. $\sqrt{\frac{x^4 + x^2 + 1}{x}} + C$

B. $\frac{x^2}{\sqrt{x^4 + x^2 + 1}} + C$

C. $x\left(x^4 + x^2 + 1\right)^{3/2} + C$

D. $\frac{\sqrt{x^4 + x^2 + 1}}{x} + C$

Answer: D

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17. $\int \frac{dx}{\sqrt{(1-x)(x-2)}}$ is equal to

A. $\sin^{-1}(2x-3)+C$

B. $\sin^{-1}(2x+5)+C$

C. $SIN^{-1}(3-2X)+C$

D. $\sin^{-1}(5-2x)+C$

Answer: A

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18. $\frac{d}{dx}\left[a\tan^{-1}x+b\log\left(\frac{x-1}{x+1}\right)\right]=\frac{1}{x^4-1}\Rightarrow a-2b=$

A. 1

B. -1

C. 0

D. 2

Answer: B

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19. $\int \frac{x^4 + x + 1}{x^2 - x + 1} dx$ is equal to

A. $\frac{x^3}{3} - \frac{x^2}{2} + x + C$

B. $\frac{x^3}{3} + \frac{x^2}{2} + x + C$

C. $\frac{x^3}{3} - \frac{x^2}{2} - x + C$

D. $\frac{x^3}{3} + \frac{x^2}{2} - x + C$

Answer: B

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20. Evaluate $\int \frac{\sec x}{(\sec x + \tan x)} dx.$

A. $\tan x - \sec x + C$

B. $\log(1 + \sec x) + C$

C. $\sec x + \tan x + C$

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

Answer: A

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21. $\int \text{cosec}^4 x dx$ is equal to

A. $\cot x + \frac{\cot^3}{3} + C$

B. $\tan x + \frac{\tan^3 x}{3} + C$

C. $-\cot x - \frac{\cot^3 x}{3} + C$

D. $-\tan x - \frac{\tan^3 x}{3} + C$

Answer: C

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22. Evaluate: $\int e^{3\log x}\left(x^4+1\right)^{-1} dx$

A. $e^{3\log x} + C$

B. $\frac{1}{4}\log\left(x^4+1\right) + C$

C. $\log\left(x^4+1\right) + C$

D. $\frac{1}{2}\log\left(x^4+1\right) + C$

Answer: B

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23. $\int \frac{1}{x^2+4x+13}dx$ is equal to

A. $\log\left(x^2+4x13\right)+C$

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

C. $\log(2x+4)+C$

D. $\frac{2x+4}{\left(x^2+4x+13\right)^2}+C$

Answer: B

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24. If $\int \frac{e^x-1}{e^x+1}dx = f(x)+C,$ then f(x) is equal to

A. $2\log(e^x + 1)$

B. $\log\left(e^{2x} - 1\right)$

C. $2\log(e^x + 1) - x$

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

Answer: C

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25. $\int \frac{4^{x+1} - 7^{x-1}}{28^x} dx$ is equal to

A. $\frac{1}{7\log_e 4} 4^{-x} - \frac{4}{\log_e 7} 7^{-x} + C$

B. $\frac{1}{7\log_e 4} 4^{-x} + \frac{4}{\log_e 7} 7^{-x} + C$

C. $\frac{4^{-x}}{\log_e 7} - \frac{7^{-x}}{\log_e 4} + C$

D. $\frac{4^{-x}}{\log_e 4} - \frac{7^{-x}}{\log_e 7} + C$

Answer: A

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26. $\int \frac{1}{1+\cos ax} dx$ is equal to

A. $\cot. \frac{ax}{2} + C$

B. $\frac{1}{a} \tan. \frac{ax}{2} + C$

C. $\frac{1}{a}(\text{cosec ax} - \cos ax) + C$

D. $\frac{1}{a}(\text{cosac ax} + \cot ax) + C$

Answer: B

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27. If $\int \frac{1}{x+x^5} dx = f(x) + c, the \neq valuate \int \frac{x^4}{x+x^5} dx \cdot$

A. $\log x - f(x) + C$

B. $f(x) + \log x + C$

C. $f(x) - \log x + C$

D. None of these

Answer: A

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28. $\int e^{-\log x} dx$ is equal to

A. $e^{-\log x} + C$

B. $-xe^{-\log x} + C$

C. $e^{\log x} + C$

D. $\log|x| + C$

Answer: D

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

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

B. $\frac{xe^x}{1 + x^2} + C$

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

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

Answer: A

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30. $\sqrt{\sin 2x}\cos 2x$

A. $\frac{1}{3}(\sin x)^{3/2}+C$

B. $\frac{1}{3}(\sin x)^{1/2}+C$

C. $\frac{1}{3}(\sin 2x)^{3/2}+C$

D. $\frac{1}{3}(\sin 2x)^{1/2}+C$

Answer: C

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31. Evaluate: $\int\frac{10x^9+10^x(\log)_e 10}{10^x+x^{10}}dx$

A. $10^x-x^{10}+C$

B. $10^x+x^{10}+C$

C. $10^x-\left(x^{10}-x^{-1}\right)+C$

D. $\log\left|10^x + x^{10}\right| + C$

Answer: D

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32. $\int \frac{e^x(1+x)}{\cos^2(e^x x)} dx$ equal to

A. $-\cot(ex^x) + C$

B. $\tan(xe^x) + C$

C. $\tan(e^x) + C$

D. $\cot(e^x) + C$

Answer: B

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33. $\int \frac{\sqrt{x}}{\sqrt{a^3 - x^3}} dx$ equal to

A. $\frac{1}{3}\sin^{-1}\sqrt{\frac{x^3}{a^3}} + C$

B. $\frac{2}{3}\sin^{-1}\sqrt{\frac{x^3}{a^3}} + C$

C. $\frac{2}{3}\sin^{-1}\sqrt{\frac{x}{a}} + C$

D. None of these

Answer: B

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34. $\int \frac{\log\sqrt{x}}{3\sqrt{x}} dx$ is equal to

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

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

C. $\frac{2}{3}(\log x)^2 + C$

D. $\frac{1}{3}(\log x)^2 + C$

Answer: A

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35. $\int (x^2+1)\sqrt{x+1}dx$ is equal to

A. $\frac{(x+1)^{7/2}}{7} - 2\frac{(x+1)^{5/2}}{5} + 2\frac{(x+1)^{3/2}}{3} + C$

B. $2\left[\frac{(x+1)^{7/2}}{7} - 2\frac{(x+1)^{5/2}}{5} + 2\frac{(x+1)^{3/2}}{3}\right] + C$

C. $\frac{(x+1)^{7/2}}{5} - 2\frac{(x+1)^{5/2}}{5} + 5$

D. $\frac{(x+1)^{7/2}}{7} - 3\frac{(x+1)^{5/2}}{5} + 11(x+1)^{1/2} + C$

Answer: B

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36. $\int \frac{dx}{\sqrt{1-e^{2x}}}$ is equal to

A. $\log\left|e^{-x}+\sqrt{e^{-2x}-1}\right|+C$

B. $\log\left|e^{x}+\sqrt{e^{2x}-1}\right|+C$

C. $-\log\left|e^{-x}+\sqrt{2x^{-2x}-1}\right|+C$

D. $-\log\left|e^{-2x}+\sqrt{e^{-2x}-1}\right|+C$

Answer: C

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37. The value of the integral $\int \frac{dx}{\left(e^{x}+e^{-x}\right)^{2}}$ is

A. $\frac{1}{2}\left(e^{2x}+1\right)+C$

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

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

D. $\frac{1}{4}\left(e^{2x}-1\right)+C$

Answer: C

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

A. $\log\left|\left(x-e^{-x}\right)\right|+C$

B. $\log\left|\left(x+e^{-x}\right)\right|+C$

C. $\log\left|\left(1+xe^{x}\right)\right|+C$

D. $\left(1+xe^{x}\right)^{2}+C$

Answer: C

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39. $\int \frac{\cos x - \sin x}{1 + 2\sin x \cos x} dx$ is equal to

A. $-\frac{1}{\cos x - \sin x} + C$

B. $\frac{\cos x + \sin x}{\cos x - \sin x} + C$

C. $-\frac{1}{\sin x + \cos x} + C$

D. $\frac{x}{\sin x + \cos x} + C$

Answer: C

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40. $\int (\sqrt[3]{x}) \left(\sqrt[5]{1 + \sqrt[3]{x^4}}\right) dx$ is equal to

A. $\left(1 + x^{\frac{3}{4}}\right)^{\frac{6}{5}} + C$

B. $\left(1 + x^{\frac{4}{3}}\right)^{\frac{6}{5}} + C$

C. $\frac{5}{8}\left(1 + x^{\frac{4}{3}}\right)^{\frac{6}{5}} + C$

D. $\frac{1}{6}\left(1+x^{\frac{4}{3}}\right)^{6}+C$

Answer: C

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41. $\int \frac{1}{x}(\log_{ex} e)dx$ is equal to

A. $\log_e(1-\log_e x)+C$

B. $\log_e(\log_e ex-1)+C$

C. $\log_e(\log_e x-1)+C$

D. $\log_e(\log_e x+1)+C$

Answer: D

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42. $\int \frac{\sin^{-1} x}{\sqrt{1-x^2}} dx$ is equal to

Where, C is an arbitrary constant.

A. $\log\left(\sin^{-1} x\right) + C$

B. $\frac{1}{2}\left(\sin^{-1} x\right)^2 + C$

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

D. $\sin\left(\cos^{-1} x\right) + C$

Answer: B

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43. $\int \frac{dx}{(x+1)\sqrt{4x+3}}$ is equal to

A. $\tan^{-1}\sqrt{4x+3} + C$

B. $3\tan^{-1}\sqrt{4x+3} + C$

C. $2\tan^{-1}\sqrt{4x+3}+C$

D. $4\tan^{-1}\sqrt{4x+3}+C$

Answer: C

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44. $\int \frac{1+x^4}{(1-x^4)^{3/2}}dx$ is equal to

A. $\frac{x}{\sqrt{1-x^4}}+C$

B. $\frac{-x}{\sqrt{1-x^4}}+C$

C. $\frac{2x}{\sqrt{1-x^4}}+C$

D. $\frac{-2x}{\sqrt{1-x^4}}+C$

Answer: A

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45. If $f'(x) = \dfrac{dx}{(1+x^2)^{3/2}}$ and $f(0) = 0$. then f(1) is equal to

A. $\sqrt{2}$

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

C. $\dfrac{1}{\sqrt{2}}$

D. None of these

Answer: C

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46. $\int \sin^3 x . \cos^2 x dx$ is equal to

A. $\dfrac{\sin^5 x}{5} - \dfrac{\sin^3 x}{3} + C$

B. $\dfrac{\sin^5 x}{5} + \dfrac{\sin^3 x}{3} + C$

C. $\frac{\cos^5 x}{5} - \frac{cso^3 x}{3} + C$

D. $\frac{\cos^5 x}{5} + \frac{\cos^3 x}{3} + C$

Answer: C

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47. $\int \frac{f'(x)}{\sqrt{f(x)}} dx = \ldots + C, f(x) \neq 0$

A. $\frac{1}{2}\sqrt{f(x)}$

B. $2\sqrt{f(x)}$

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

D. $2f(x)$

Answer: B

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48. $\int \frac{\sin x \cos x}{\sqrt{1-\sin^4 x}} dx$ is equal to

A. $\frac{1}{2}\sin^{-1}\left(\sin^2 x\right) + C$

B. $\frac{1}{2}\cos^{-1}\left(\sin^2 x\right) + C$

C. $\tan^{-1}\left(\sin^2 x\right) + C$

D. $\tan^{-1}\left(2\sin^2 x\right) + C$

Answer: A

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49. $\int e^x(1+x)\sec^2(xe^x)dx = f(x) +$ Constant , then f (x) is equal to

A. $\cos(xe^x)$

B. $\sin(xe^x)$

C. $2\tan^{-1}(x)$

D. $\tan(xe^x)$

Answer: D

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50. $\int\left(e^x+e^{-x}\right)^2\cdot\left(e^x-e^{-x}\right)dx$ is equal to

A. e^x+C

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

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

D. $\frac{1}{3}\left(e^x+e^{-x}\right)^3+C$

Answer: D

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51. $\int (\sin x - \cos x)^4 (\sin x + \cos x) dx$ is equal to

A. $\frac{\sin x - \cos x}{5} + C$

B. $\frac{(\sin x - \cos x)^5}{5} + C$

C. $\frac{(\sin x - \cos x)^4}{4} + C$

D. $\frac{(\sin x + \cos x)^5}{5} + C$

Answer: B

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52. If $l = \int \frac{x^5}{\sqrt{1+x^3}} dx$, then I is equal to

A. $\frac{2}{9}(1+x^3)^{\frac{5}{2}} + \frac{2}{3}(1+x^3)^{\frac{3}{2}} + C$

B. $\log\left|\sqrt{x}+\sqrt{1+x^3}\right|+C$

C. $\log\left|\sqrt{x}-\sqrt{1+x^3}\right|+C$

D. $\frac{2}{9}\left(1+x^3\right)^{\frac{3}{2}}-\frac{2}{3}\left(1+x^3\right)^{\frac{1}{2}}+C$

Answer: D

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53. $\int\cos\left\{2\tan^{-1}\sqrt{\frac{1-x}{1+x}}\right\}dx$ is equal to

A. $\frac{1}{8}\left(x^2-1\right)+C$

B. $\frac{x^2}{4}+C$

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

D. $\frac{x^2}{2}+C$

Answer: D

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54. $\int \frac{1+\tan^2 x}{1-\tan^2 x} dx$

A. $\log\left(\frac{1-\tan x}{1+\tan x}\right)+C$

B. $\log\left(\frac{1+\tan x}{1-\tan x}\right)+C$

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

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

Answer: D

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55. $\int e^{\tan^{-1} x}\left(1+\frac{x}{1+x^2}\right)dx$ is equal to

A. $xe^{\tan^{-1} x}+C$

B. $x^2 e^{\tan^{-1} x} + C$

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

D. None of these

Answer: A

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56. The value of $\int \frac{1}{x + \sqrt{x-1}} dx$, is

A. $\log\left(x + \sqrt{x-1}\right) + \sin^{-1}\left(\sqrt{\frac{x-1}{x}}\right) + C$

B. $\log\left(x + \sqrt{x-1}\right) + C$

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

D. None of the above

Answer: C

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57. $\int [\sin(\log x) + \cos(\log x)]dx$

A. $x\log(\log x) + C$

B. $\sin(\log x) + C$

C. $\cos(\log x) + C$

D. $x\sin(\log x) + C$

Answer: D

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58. The value of the integral $\int x\sin^{-1}xdx$ is equal to

A. $\frac{1}{2}x^2\sin^{-1}x + \frac{1}{4}x\sqrt{1-x^2} - \frac{1}{4}\sin^{-1}x + C$

B. $\frac{1}{2}x^2\sin^{-1}x - \frac{1}{4}x\sqrt{1-x^2} - \frac{1}{4}\sin^{-1}x + C$

C. $\frac{1}{2}x^2\sin^{-1}x + \frac{1}{4}x\sqrt{1-x^2} + \frac{1}{4}\sin^{-1}x + C$

D. $\frac{1}{2}x^2\sin^{-1}x + \frac{1}{4}\sqrt{1-x^2} - \frac{1}{4}\sin^{-1}x + C$

Answer: A

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59. $\int 32x^3(\log x)^2$ dx is equal ot

A. $8x^4(\log x)^2 + C$

B. $x^4\left\{8(\log x)^2 - 4\log x + 1\right\} + C$

C. $x^4\left\{8(\log x)^2 - 4\log x\right\} + C$

D. $x^3\left\{(\log x)^2 + 2\log x\right\} + C$

Answer: B

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60. $\int e^x (1 - \cot x + \cot^2 x) dx =$

A. $e^x \cot x + C$

B. $e^x \text{cosec x} + C$

C. $-e^x \cot x + C$

D. $-e^x \text{cosec x} + C$

Answer: C

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61. The integral $\int \left(1 + x - \frac{1}{x}\right) e^{x + \frac{1}{x}} dx$ is equal to

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

B. $-xe^{x+\frac{1}{x}}+C$

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

D. $xe^{x+\frac{1}{x}}+C$

Answer: D

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62. If $\int\left(\frac{x^2-x+1}{x^2+1}\right)e^{\cot^{-1}x}dx=A(x)e^{\cot^{-1}x}+c, A=$

A. $-x$

B. x

C. $\sqrt{1-x}$

D. $\sqrt{1+x}$

Answer: B

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63. $\int e^{\sin\theta}\left[\log\sin\theta+\operatorname{cosec}^2\theta\right]\cos\theta d\theta$ is equal to

A. $\int e^{\sin\theta}\left[\log\sin\theta+\operatorname{cosec}^2\theta\right]+C$

B. $e^{\sin\theta}\left[\log\sin\theta+\operatorname{cosec}\ \theta\right]+C$

C. $e^{\sin\theta}\left[\log\sin\theta-\operatorname{cosec}\ \theta\right]+C$

D. $e^{\sin\theta}\left[\log\sin\theta-\operatorname{cosec}^2\theta\right]+C$

Answer: C

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64. $\int\left\{\log(\log x)+\frac{1}{(\log x)^2}\right\}dx=x\{f(x)-g(x)\}+C$, then

A. $f(x)=\log(\log x), g(x)=\frac{1}{\log x}$

B. $f(x) = \log x, g(x) = \dfrac{1}{\log x}$

C. $f(x) = \dfrac{1}{\log x}, g(x) = \log(\log x)$

D. $f(x) = \dfrac{1}{x \log x}, g(x) = \dfrac{1}{\log x}$

Answer: A

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65. $\int \tan^{-1} x dx = \ldots. + C$

A. $\dfrac{1}{1+x^2}$

B. $x \tan^{-1} x + \dfrac{1}{2} \log|1+x^2|$

C. $x \tan^{-1} x + \dfrac{1}{2} . \dfrac{\tan^{-1} x}{1+x^2}$

D. $x \tan^{-1} x - \dfrac{1}{2} \log|1+x^2|$

Answer: D

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66. If $\int f(x)dx = g(x),$ then $\int f(x)g(x)dx$ is equal to

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

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

C. $\frac{1}{2}[g'(x)]^2$

D. $f'(x)g(x)$

Answer: B

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67. If $l_n = \int x^n . e^{cx}dx$ for $n \geq 1$, then $C . l_n + n . l_{n-1}$ is equal to

A. $x^n e^{cx}$

B. x^n

C. e^{cx}

D. $x^n + e^{cx}$

Answer: A

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68. If $f(x) = \frac{\sin^{-1} x}{\sqrt{1-x^2}}$ and $g(x) = e^{\sin^{-1} x}$, then $\int f(x)g(x)dx$ is equal to

A. $e^{\sin^{-1} x}\left(\sin^{-1} x - 1\right) + C$

B. $e^{\sin^{-1} x} + C$

C. $e^{\left(\sin^{-1} x\right)^2} + C$

D. $e^{2\sin^{-1} x} + C$

Answer: A

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69. If $\int f(x)dx = g(x)$ then $\int f^{-1}(x)dx$ is

A. $xf^{-1}(x) + C$

B. $f\{g^{-1}(x)\} + C$

C. $xf^{-1}(x) - g\{f^{-1}(x)\} + C$

D. $g^{-1}(x) + C$

Answer: C

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70. The value of $\int e^x \left(x^5 + 5x^4 + 1\right)dx$ is

A. $e^x . x^5 + C$

B. $e^x . x^5 + e^x + C$

C. $e^{x+1} . e^5 + C$

D. $5x^4 . e^x + C$

Answer: B

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71. $\int \frac{\cos x - 1}{\sin x + 1} . e^x dx$ is equal to

A. $\frac{e^x \cos x}{1 + \sin x} + C$

B. $C - \frac{e^x \sin x}{1 + \sin x}$

C. $C - \frac{e^x}{1 + \sin x}$

D. $C - \frac{e^x \cos x}{1 + \sin x}$

Answer: A

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72. The value of $\int [f(x)g''(x) - f''(x)g(x)]dx$ is equal to

A. $\frac{f(x)}{g'(x)}$

B. $f'(x)g(x) - f(x)g'(x)$

C. $f(x)g'(x) - f'(x)g(x)$

D. $f(x)g'(x) + f'(x)g(x)$

Answer: C

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73. $\int \frac{1 + \tan x}{e^{-x} \cos x} dx$ is equal to

A. $e^{-x}\tan x + C$

B. $e^{-x}\sec x + C$

C. $e^{x}\sec x + C$

D. $e^{x}\tan x + C$

Answer: C

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74. $\int \sqrt{x} e^{\sqrt{x}} dx$ is equal to

A. $2\sqrt{x} - e^{\sqrt{x}} - 4\sqrt{xe^{\sqrt{x}}} + C$

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

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

D. $\left(1 - 4\sqrt{x}\right)e^{\sqrt{x}} + C$

Answer: B

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75. $\int \frac{1}{x^2-9}dx$ is equal to

A. $\log\left|\frac{x-3}{x+3}\right|+C$

B. $\frac{1}{6}\log\left|\frac{x-3}{x+3}\right|+C$

C. $\frac{1}{6}\log\left|\frac{x+3}{x-3}\right|+C$

D. $\log\left|\frac{x+3}{x-3}\right|+C$

Answer: B

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76. If

$$\int \frac{dx}{(x+2)(x^2+1)} = a\log|1+x^2| + b\tan^{-1}x + \frac{1}{5}\log|x+2| + C$$

, then

A. $a = \frac{-1}{10}, b = \frac{-2}{5}$

B. $a = \frac{1}{10}, b = \frac{-2}{5}$

C. $a = \frac{-1}{10}, b = \frac{2}{5}$

D. $a = \frac{1}{10}, b = \frac{2}{5}$

Answer: C

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77. $\int \frac{dx}{x(x^2+1)}$ is equal to

A. $\log|x| - \frac{1}{2}\log(x^2+1) + C$

B. $\log|x| + \frac{1}{2}\log\left(x^2+1\right) + C$

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

D. $\frac{1}{2}\log|x| + \log\left(x^2+1\right) + C$

Answer: A

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78. $\int \frac{xdx}{(x-1)(x-2)}$ is equals to

A. $\log\left|\frac{(x-1)^2}{x-2}\right| + C$

B. $\log\left|\frac{(x-2)^2}{x-1}\right| + C$

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

D. $\log|(x-1)(x-2)| + C$

Answer: B

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79. The value of $\int \frac{\cos x dx}{(\sin x - 1)(\sin x - 2)}$ is equal to

A. $\log\left|\frac{\sin x - 2}{\sin x - 1}\right| + C$

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

C. $\log(\sin x - 2) + C$

D. None of these

Answer: A

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80. If $\int \frac{x+2}{2x^2+6x+5} dx$
$= P\int \frac{4x+6}{2x^2+6x+5} dx + \frac{1}{2}\int \frac{dx}{2x^2+6x+5'}$

Then the value of P is

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

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

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

D. 2

Answer: C

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81. If $\int \frac{1}{x^3+x^4}dx = \frac{A}{x^2} + \frac{B}{x} + \log\left|\frac{x}{x+1}\right| + C$, then

A. $A = \frac{1}{2}, B = 1$

B. $A = 1, B = -\frac{1}{2}$

C. $A = -\frac{1}{2}, B = 1$

D. A = 1, B = 1

Answer: C

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82. The value of $\int \frac{3x+2}{(x-2)^2(x-3)}dx$ is equal to

A. $11\frac{\log(x-3)}{x-2} - \frac{8}{x-2} + C$

B. $11\frac{\log(x+3)}{x+2} - \frac{8}{x-2} + C$

C. $11\frac{\log(x-3)}{x-2} + \frac{8}{x-2} + C$

D. $11\frac{\log(x+3)}{x+2} + \frac{8}{x-2} + C$

Answer: C

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83. $\int \frac{2x^2+3}{(x^2-1)(x^2+4)}dx = a\log\left(\frac{x+1}{x-1}\right) + b\tan^{-1}\frac{x}{2}$, then (a,b) is

A. $(1, -1)$

B. $(-1, 1)$

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

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

Answer: D

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84. $\int \frac{x}{(x^2-a^2)(x^2-b^2)}dx$ is equal to

A. $\frac{1}{a^2-b^2}\log\left|\frac{x^2-a^2}{x^2-b^2}\right| + C$

B. $\frac{1}{a^2-b^2}\log\left|\frac{x^2-b^2}{x^2-a^2}\right| + C$

C. $\frac{1}{2(a^2-b^2)}\log\left|\frac{x^2-a^2}{x^2-b^2}\right|+C$

D. $\frac{1}{2(a^2-b^2)}\log\left|\frac{x^2-b^2}{x^2-a^2}\right|+C$

Answer: C

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85. $\int\frac{1}{x\sqrt{1-x^3}}dx$ is equal to

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

B. $\frac{2}{3}\log\left(\frac{1}{\sqrt{1-x^3}}\right)+C$

C. $\frac{1}{3}\log\left(\frac{\sqrt{1-x^3}-3}{\sqrt{1-x^3}+3}\right)+C$

D. $\frac{1}{3}\log\left(\frac{\sqrt{1-x^3}-3}{\sqrt{1-x^3}+1}\right)+C$

Answer: D

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86. If $\int \frac{\sin x}{\cos x(1+\cos x)} dx = f(x) + C$, then f(x) is equal to

A. $\log \left| \frac{1+\cos x}{\cos x} \right|$

B. $\log \left| \frac{\cos x}{1+\cos x} \right|$

C. $\log \left| \frac{\sin x}{1+\sin x} \right|$

D. $\log \left| \frac{1+\sin x}{\sin x} \right|$

Answer: A

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Practice Exercise Exercise 2 Miscellaneous Problems

1. $\int \frac{3+2\cos x}{(2+3\cos x)^2} dx$ is equal to

A. $\left(\frac{\sin x}{2+3\cos x}\right)+C$

B. $\left(\frac{2\cos x}{2+3\sin x}\right)+C$

C. $\left(\frac{2\cos x}{2+3\cos x}\right)+C$

D. $\left(\frac{2\sin x}{2+3\sin x}\right)+C$

Answer: A

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2. The integral $\int \frac{dx}{x^2(x^4+1)^{3/4}}$ equal

A. $\left(\frac{x^4+1}{x^4}\right)^{1/4}+C$

B. $(x^4+1)^{1/4}+C$

C. $-(x^4+1)^{1/4}+C$

D. $-\left(\frac{x^4+1}{x^4}\right)^{1/4}+C$

Answer: D

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3. The integral $\int \frac{2x^{12}+5x^9}{\left(x^5+x^3+1\right)^3}dx$ is equal to (where C is a constant of integration)

A. $\frac{x^2+2x}{\left(x^5+x^3+1\right)^2}+C$

B. $\frac{x^{10}}{2\left(x^5+x^3+1\right)^2}+C$

C. $\ln\left|x^5+x^3+1\right|+\sqrt{\left(2x^7+5x^4\right)}+C$

D. None of these

Answer: B

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4. $\int \frac{\cos 4x - 1}{\cot x - \tan x} dx$ is equal to

A. $-\frac{1}{2}\cos 4x + C$

B. $-\frac{1}{4}\cos 4x + C$

C. $-\frac{1}{2}\sin 2x + C$

D. None of these

Answer: D

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5. Evaluate $\int (1 - \cos x)\text{cosec}^2 x dx$

A. $\tan x + C$

B. $\tan. \frac{x}{2} + C$

C. $\frac{1}{2}\tan. \frac{x}{2} + C$

D. None of these

Answer: B

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6. If $\int \cos^4 x dx = Ax + B\sin 2x + C\sin 4x + D,$ then $\{A, B, C\}$ equals to

A. $\left\{\frac{3}{8}, \frac{1}{32}, \frac{1}{4}\right\}$

B. $\left\{\frac{3}{8}, \frac{1}{4}, \frac{1}{32}\right\}$

C. $\left\{\frac{1}{32}, \frac{1}{4}, \frac{3}{8}\right\}$

D. $\left\{\frac{1}{4}, \frac{3}{8}, \frac{1}{32}\right\}$

Answer: B

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7. $\int x^{-2/3}\left(1+x^{1/2}\right)^{-5/3}$ dx is equal to

A. $3\left(1+x^{-1/2}\right)^{-1/3}+C$

B. $3\left(1+x^{-1/2}\right)^{-2/3}+C$

C. $3\left(1+x^{1/2}\right)^{-2/3}+C$

D. None of the above

Answer: B

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8. $\int\left(x^3-1\right)^{1/3}x^5dx$ is equal to

A. $\frac{1}{7}\left(x^3+1\right)^{1/3}+\frac{1}{4}\left(x^3-1\right)^{3/4}+C$

B. $\frac{1}{7}\left(x^3-1\right)^{7/3}+\frac{1}{4}\left(x^3-1\right)^{4/3}+C$

C. $\frac{3}{7}\left(x^3-1\right)^{7/3}+\frac{1}{4}\left(x^3-1\right)^{4/3}+C$

D. None of the above

Answer: B

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9. $\int |x| \ln |x| dx$ equals $(x \neq 0)$

A. $\frac{x^2}{2} \ln |x| - \frac{x^2}{4} + C$

B. $\frac{1}{2} x |x| \ln x + \frac{1}{4} x |x| + C$

C. $-\frac{x^2}{2} \ln |x| + \frac{x^2}{4} + C$

D. $\frac{1}{2} x |x| \ln |x| - \frac{1}{4} x |x| + C$

Answer: D

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10. $\int\left(x-.^{11}C_1x^2+.^{11}C_2x^3-.^{11}C_3x^4+\ldots-.^{11}C_{x^{12}}\right)dx$

equal to

A. $\frac{(1-x)^{12}}{12}-\frac{(1-x)^{11}}{11}+C$

B. $\frac{(1-x)^{13}}{13}-\frac{(1-x)^{12}}{12}+C$

C. $\frac{(1-x)^{11}}{11}-\frac{(1-x)^{12}}{12}+C$

D. $\frac{(1-x)^{12}}{12}-\frac{(1-x)^{13}}{13}+C$

Answer: B

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11. if $I=\int\frac{\log\left(t+\sqrt{1+t^2}\right)}{\sqrt{1+t^2}}dt=\frac{1}{2}(g(t))^2+c$ then $g(2)$ is (A) $2\log\left(2+\sqrt{5}\right)$ (B) $\log\left(2+\sqrt{5}\right)$ (C) $\frac{1}{\sqrt{5}}\log\left(2+\sqrt{5}\right)$ (D) $\frac{1}{2}\log\left(2+\sqrt{5}\right)$

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

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

C. $2\log\left(2+\sqrt{5}\right)$

D. $\log\left(2+\sqrt{5}\right)$

Answer: D

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12. The integral $\int \frac{dx}{\left(\sqrt{x}+\sqrt[3]{x^2}\right)}$ represents the function

A. $6\left\{\sqrt[3]{x^2}-\sqrt[3]{x}+\ln\left|1+\sqrt[3]{x}\right|\right\}+C$

B. $3\sqrt[3]{x^2}-6\sqrt[6]{x}+6\ln\left|1+\sqrt[6]{x}\right|+C$

C. $3\sqrt[3]{x^2}+6\sqrt[6]{x}+6\ln\left|1+\sqrt[6]{x}\right|+C$

D. $6\sqrt[3]{x^2}-3\sqrt[3]{x}+6\ln\left|1+\sqrt[3]{x}\right|+C$

Answer: B

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13. $\int \frac{\left(x^4 - x\right)^{1/4}}{x^5} dx$ is equal to

A. $\frac{4}{15}\left(1 - \frac{1}{x^3}\right)^{5/4} + C$

B. $\frac{4}{5}\left(1 - \frac{1}{x^3}\right)^{5/4} + C$

C. $\frac{4}{15}\left(1 + \frac{1}{x^3}\right)^{5/4} + C$

D. None of these

Answer: A

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14. $\int \frac{dx}{e^x + e^{-x} + 2}$ is equal to

A. $\frac{1}{e^x+1}+C$

B. $\frac{1}{e^x+1}+C$

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

D. None of these

Answer: D

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15. $\int\sqrt{\frac{x}{1-x^3}}dx$ is equal to

A. $\frac{2}{3}\sin^{-1}\left(x^{2/3}\right)+C$

B. $\frac{3}{2}\sin^{-1}\left(x^{2/3}\right)+C$

C. $\frac{3}{2}\sin^{-1}\left(x^{2/3}\right)+C$

D. $\frac{2}{3}\sin^{-1}\left(x^{2/3}\right)+C$

Answer: A

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16. The value of the integral $\int \frac{dx}{x^n(1+x^n)^{1/n}}, n \in N$ is

A. $\frac{1}{(1-n)}\left(1+\frac{1}{x^n}\right)^{1-1/n}+C$

B. $\frac{1}{(1-n)}\left(1-\frac{1}{x^n}\right)^{1-1/n}+C$

C. $\frac{1}{(1-n)}\left(1-\frac{1}{x^n}\right)^{1-1/n}+C$

D. $\frac{1}{(1-n)}\left(1-\frac{1}{x^n}\right)^{1-1/n}+C$

Answer: A

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17. $\int \frac{\sqrt{x^2+1}}{x^4} dx$ is equal to

A. $\frac{1}{3}\left(1+\frac{1}{x^2}\right)^{3/2}+C$

B. $\frac{2}{3}\left(1+\frac{1}{x^2}\right)^{3/2}+C$

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

D. $\frac{3}{2}\left(1+\frac{1}{x^2}\right)^{3/2}+C$

Answer: C

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18. Integral of $\frac{x^3+3x+4}{\sqrt{x}}$ is

A. $\frac{2}{7}x^{5/2}+\frac{2}{3}x^{3/2}+8x^{1/2}+C$

B. $\frac{2}{7}x^{7/2}+2x^{3/2}+8x^{1/2}+C$

C. $\frac{1}{7}x^{7/2} + 2x^{3/2} + 8x^{1/2} + C$

D. $x^{7/2} + 3x^{3/2} + 4x^{1/2} + C$

Answer: B

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19. If $\frac{d}{dx}f(x) = 4x^3 - \frac{3}{x^4}$ such that $f(2) = 0$. Then f(x) is(A) $x^4 + \frac{1}{x^3} - \frac{129}{8}$ (B) $x^3 + \frac{1}{x^4} + \frac{129}{8}$(C) $x^4 + \frac{1}{x^3} + \frac{129}{8}$ (D) $x^3 + \frac{1}{x^4} - \frac{129}{8}$

A. $x^4 + \frac{1}{x^3} - \frac{129}{8}$

B. $x^3 + \frac{1}{x^4} + \frac{129}{8}$

C. $x^4 + \frac{1}{x^3} + \frac{129}{8}$

D. $x^3 + \frac{1}{x^4} - \frac{129}{8}$

Answer: A

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20. $\int \frac{dx}{x(\log x)^m}$ is equal to then

A. $\frac{(\log x)^m}{m} + C$

B. $\frac{(\log x)^{m-1}}{m-1} + C$

C. $\frac{(\log x)^{1-m}}{1-m} + C$

D. $\frac{(\log x)^{1-m}}{m} + C$

Answer: C

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21. The integral of the function $\tan^4 x$ is

A. $\frac{\tan^3 x}{3} - \tan x - x + C$

B. $\frac{\tan^3 x}{3} + \tan x - x + C$

C. $\frac{\tan^3 x}{3} - \tan x + x + C$

D. $\frac{\tan^3 x}{3} + \tan x + x + C$

Answer: C

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22. Find $\int \frac{\sin^6 x}{\cos^8 x} dx$.

A. $\frac{\tan^6 x}{6} + C$

B. $\frac{\tan^7 x}{7} + C$

C. $\frac{\tan^8 x}{8} + C$

D. None of these

Answer: B

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23. $\int \frac{x^9}{(4x^2+1)^6} dx$ is equal to (A) $\frac{1}{5x}\left(4+\frac{1}{x^2}\right)^{-5}+c$ (B) $\frac{1}{5}\left(4+\frac{1}{x^2}\right)^{-5}+c$ (C) $\frac{1}{10x}(4x+1)^{-5}+c$ (D) $\frac{1}{10}\left(\frac{1}{x^2}+4\right)^{-5}+c$

A. $\frac{1}{5x}\left(5+\frac{1}{x^2}\right)^{-5}+C$

B. $\frac{1}{5}\left(4+\frac{1}{x^2}\right)^{-5}+C$

C. $\frac{1}{10x}(1+4)^{-5}+C$

D. $\frac{1}{10}\left(\frac{1}{x^2}+4\right)^{-5}+C$

Answer: D

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24. $\int \frac{1}{\sqrt{9x-4x^2}}dx$ is equal to

A. $\frac{1}{9}\sin^{-1}\left(\frac{9x-8}{8}\right)+C$

B. $\frac{1}{2}\sin^{-1}\left(\frac{8x-9}{9}\right)+C$

C. $\frac{1}{3}\sin^{-1}\left(\frac{9x-8}{8}\right)+C$

D. $\frac{1}{2}\sin^{-1}\left(\frac{9x-8}{9}\right)+C$

Answer: B

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25. $\int \frac{x+\sin x}{1+\cos x}dx$ is equal to

A. $\log|1+\cos x|+C$

B. $\log|x+\sin x|+C$

C. $x-\tan x/2+C$

D. $x\tan\left(\frac{x}{2}\right)+C$

Answer: D

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26. $\int\sqrt{1-4x-x^2}dx$

A. $\frac{x}{2}\sqrt{1-4x-x^2}+\frac{5}{2}\sin^{-1}\left(\frac{x+2}{\sqrt{5}}\right)+C$

B. $\frac{x}{2}\sin^{-1}\left(\frac{x+2}{\sqrt{5}}\right)+\frac{5}{2}\sqrt{1-4x-x^2}+C$

C. $\frac{x+2}{2}\sin^{-1}\left(\frac{x+2}{\sqrt{5}}\right)+\frac{5}{2}\sqrt{1-4x-x^2}+C$

D. $\frac{x+2}{2}\sqrt{1-4x-x^2}+\frac{5}{2}\sin^{-1}\left(\frac{x+2}{\sqrt{5}}\right)+C$

Answer: D

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27. $\int \frac{dx}{\sin x - \cos x + \sqrt{2}}$ is equal to

A. $-\frac{1}{\sqrt{2}}\tan\left(\frac{x}{2}+\frac{\pi}{8}\right)+C$

B. $\frac{1}{\sqrt{2}}\tan\left(\frac{x}{2}+\frac{\pi}{8}\right)+C$

C. $\frac{1}{\sqrt{2}}\cot\left(\frac{x}{2}+\frac{\pi}{8}\right)+C$

D. $-\frac{1}{\sqrt{2}}\cot\left(\frac{x}{2}+\frac{\pi}{8}\right)+C$

Answer: D

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28. $\int \frac{\cos ec^2 x - 2005}{\cos^{2005} x}.dx$

A. $\frac{\cot x}{(\cos x)^{2005}}+C$

B. $\frac{\tan x}{(\cos x)^{2005}}+C$

C. $-\frac{\tan x}{(\cos x)^{2005}}+C$

D. $\frac{-\cot x}{(\cos x)^{2005}} + C$

Answer: D

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29. $\int \frac{x-3}{(x-1)^3} . e^x dx$ is equal to

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

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

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

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

Answer: D

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30. $\int \cos 2x . \cos 4x . \cos 6x dx$ is equal to

A. $\frac{\sin 12x}{12} + \frac{\sin 8x}{4} + \frac{\sin 4x}{2} + C$

B. $\frac{1}{4}\left[\frac{\frac{\sin 12x}{12} + \sin 8x}{4} + \frac{\sin 4x}{2}\right] + C$

C. $\frac{1}{4}\left[\frac{\sin 12x}{12} + \frac{\sin 8x}{8} + \frac{\sin 4x}{4}\right] + C$

D. None of these

Answer: D

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31. $\int e^{-x}(1 - \tan x)\sec x dx$ is equal to

A. $e^x \cos x + C$

B. $e^x \sec x + C$

C. $e^x \sin x + C$

D. $e^x \tan x + C$

Answer: B

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32. $\int \left[\frac{x}{\sqrt{x^2 + a^2} + \sqrt{x^2 - a^2}} \right] dx$

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33. $\int \frac{(1 + x)\sin x}{(x^2 + 2x)\cos^2 x - (1 + x)\sin 2x} dx$

A. $\frac{1}{2}\log_e \left| \frac{\sin x - (x + 1)\cos x - 1}{\sin x - (x + 1)\cos x + 1} \right| + C$

B. $\frac{1}{2}\tan^{-1}\{\sin x - (x + 1)\cos x\} + C$

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

D. $\frac{1}{2}\sin^{-1}(\cos x + \sin x) + C$

Answer: A

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34. $\int \frac{x\cos x+1}{\sqrt{2x^3e^{\sin x}+x^2}}dx$

A. $\log\left|\frac{\sqrt{2xe^{\sin x}+1}-1}{\sqrt{2xe^{\sin x}+1}+1}\right|+C$

B. $\log\left|\frac{\sqrt{2xe^{\sin x}-1}+1}{\sqrt{2xe^{\sin x}+1}+1}\right|+C$

C. $\log\left|\frac{\sqrt{2xe^{\sin x}+1}+1}{\sqrt{2xe^{\sin x}-1}+1}\right|+C$

D. $\log\left|\frac{\sqrt{2xe^{\sin x}+1}+1}{\sqrt{2xe^{\sin x}-1}-1}\right|+C$

Answer: A

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35. $\int \frac{1}{\left((x-1)^3(x+2)^5\right)^{\frac{1}{4}}} dx$ is equal to

A. $\frac{4}{3}\left(\frac{x-1}{x+2}\right)^{1/4} + C$

B. $\frac{4}{3}\left(\frac{x+2}{x-1}\right)^{1/4} + C$

C. $\frac{1}{3}\left(\frac{x-1}{x+2}\right)^{1/4} + C$

D. $\frac{1}{3}\left(\frac{x+2}{x-1}\right)^{1/4} + C$

Answer: C

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36. $\int \cos 2\theta \log\left(\frac{\cos\theta + \sin\theta}{\cos\theta - \sin\theta}\right) =$

A. $(\cos\theta - \sin\theta)^2 \log\left(\frac{\cos\theta + \sin\theta}{\cos\theta - \cos\theta}\right) + C$

B. $(\cos\theta + \sin\theta)^2 \log\left(\frac{\cos\theta + \sin\theta}{\cos\theta - \sin\theta}\right) + C$

C. $\frac{(\cos\theta-\sin\theta)^2}{2}\log\left(\frac{\cos\theta-\sin\theta}{\cos\theta+\sin\theta}\right)+C$

D. $\frac{1}{2}\sin 2\theta\log\tan\left(\frac{\pi}{4+\theta}-\frac{1}{2}\log\sec 2\theta+C\right.$

Answer: D

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37. $\int\tan(x-\alpha).\tan(x+\alpha).\tan 2x dx$ is equal to

A. $\ln\left|\frac{\sqrt{\sec 2x}.\sec(x-\alpha)}{\sec(x-\alpha)}\right|+C$

B. $\ln\left|\frac{\sqrt{\sec 2x}}{\sec(x-\alpha).\sec(x+\alpha)}\right|+C$

C. $\ln\left|\frac{\sqrt{\sec 2x}.\sec(x-\alpha)}{\sec(x+\alpha)}\right|+C$

D. $\ln\left|\frac{\sec 2x}{\sec(x-\alpha).\sec(x+\alpha)}\right|+C$

Answer: B

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38. $\int \frac{\left(\sqrt{x^2+1}\left(\ln\left(x^2+1\right)-2\ln x\right)\right)}{x^4}dx$

A. $\frac{\left(x^2+1\right)^{3/2}}{x^3}\left[\frac{2}{3}-\ln\left(\frac{x^2+1}{x^2}\right)\right]+C$

B. $\frac{\left(x^2+1\right)^{3/2}}{3x^3}\left[\ln\left(\frac{x^2+1}{x^2}\right)-\frac{2}{3}\right]+C$

C. $\frac{\left(x^2+1\right)^{3/2}}{3x^3}\left[\frac{2}{3}-\ln\left(\frac{x^2+1}{x^2}\right)\right]+C$

D. $\frac{\sqrt{x^2+1}}{3x^3}\left(\ln.\ \frac{x^2+1}{x^2}-\frac{2}{3}\right)+C$

Answer: C

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39. $\int \frac{dx}{\sqrt{\sin^3 x\sin(x+\alpha)}}$

A. $2\ \ \text{cosec}\alpha\sqrt{\cos\alpha+\sin\alpha.\cot x}+C$

B. $-2\text{cosec}\ \alpha\sqrt{\cos\alpha+\sin\alpha.\cot x}+C$

C. $\text{cosec}\ \alpha\sqrt{\cos\alpha+\sin\alpha+\sin\alpha.\cot x}+C$

D. None of these

Answer: B

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40. If $\int\frac{dx}{\sqrt[3]{\sin^{11}x\cos x}}=-\left[\frac{3}{8}f(x)+\frac{3}{2}g(x)\right]+C$, then

A. $f(x)=\tan^{-8/3}x, g(x)=\tan^{-2/3}x$

B. $f(x)=\tan^{8/3}x, g(x)=\tan^{-2/3}x$

C. $f(x)=\tan^{-8/3}x, g(x)=\tan^{2/3}x$

D. $f(x)\tan^{4/3}x, g(x)=\tan^{-4/3}x$

Answer: A

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41. $\int \frac{\tan x}{\sqrt{\sin^4 x + \cos^4 x}} dx$ is equal to

A. $\ln\left(\tan^2 x\right) + \sqrt{1 + \tan^2 x} + C$

B. $\sec x + C$

C. $\sqrt{1 - \tan^2 x} + C$

D. None of the above

Answer: D

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42. If $I = \int \frac{\sin x + \sin^3 x}{\cos 2x} dx = P \cos x + Q \log|f(x)| + R$, then

A. $P = \frac{1}{2}, Q = \frac{1}{4\sqrt{2}}$

B. $P = \frac{1}{4}, Q = -\frac{1}{\sqrt{2}}$

C. $f(x) = \frac{\cos x + 1}{\sqrt{2}\cos x - 1}$

D. $f(x) = \frac{\sqrt{2}\cos x - 1}{\sqrt{2}\cos x + 1}$

Answer: D

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43. $\int \frac{2}{(2-x)^2}\sqrt[3]{\frac{2-x}{2+x}}dx$ is equal to

A. $\frac{4}{3}\left(\frac{2+x}{2-x}\right)^{2/3} + C$

B. $\frac{3}{4}\left(\frac{2+x}{2-x}\right)^{2/3} + C$

C. $\frac{3}{4}\left(\frac{2-x}{2+x}\right)^{2/3}$

D. $\frac{3}{4}\left(\frac{2+x}{2-x}\right)^{4/3} + C$

Answer: B

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44. $\int \frac{x^2 + \cos^2 x}{x^2 + 1} . \operatorname{cosec}^2 x dx$ is equal to

A. $\cot x + \cot^{-1} x + C$

B. $-e^{\ln \tan^{-1}} x - \cot x + C$

C. $C - \cot x + \cot^{-1} x$

D. $-\tan^{-1} x - \frac{\operatorname{cosec} x}{\sec x} + C$

Answer: C

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45. In the integral

$\int \frac{\cos 8x + 1}{\cot 2x - \tan 2x} dx = A \cos 8x + k$, where k is an arbitrary constant,then A is equal to

A. $-\frac{1}{16}$

B. $\frac{1}{16}$

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

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

Answer: A

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46. $\int \frac{dx}{a^2 \sin^2 x + b^2 \cos^2 x}$ is equal to

A. $\frac{1}{ab} \tan^{-1}\left(\frac{a \tan x}{b}\right) + C$

B. $\frac{1}{b} \tan^{-1}\left(\frac{a \tan x}{b}\right) + C$

C. $\frac{b}{a} \tan^{-1}\left(\frac{b \tan x}{a}\right) + C$

D. None of these

Answer: A

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47. If $\int \frac{\sqrt{\cot x}}{\sin x \cos x} dx = P\sqrt{\cot x} + Q,$ then the value of P is

A. -2

B. 2

C. 3

D. -3

Answer: A

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48. $\int e^{e^{e^x}} . e^{e^x} . e^x dx = ... + C$

A. e^{e^x}

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

C. $e^{e^{e^x}}$

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

Answer: C

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49. $\int \text{cosec}(x-a)\text{cosec}x dx$ is equal to

A. $\frac{-1}{\sin a}\log|\sin x \text{cosec}\ \ (x-a)| + C$

B. $\frac{-1}{\sin a}\log[\sin(x-a)\sin x] + C$

C. $\frac{1}{\sin a}\log[\sin(x-a)\text{cosec x}] + C$

D. $\frac{1}{\sin a}\log[\sin(x-a)\sin x] + C$

Answer: A

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50. If $f\left(\frac{3x-4}{3x+4}\right) = x+2$, then $\int$ f(x)dx is equal to

A. $e^{x+2}\log\left|\frac{3x-4}{3x+4}\right| + C$

B. $-\frac{8}{3}\log|1-x| + \frac{2}{3}x + C$

C. $\frac{8}{3}\log|1-x| + \frac{x}{3} + C$

D. $e^{[(3x-4)/(3x+4)]} - \frac{x^2}{2} - 2x + C$

Answer: B

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51. $\int \frac{dx}{\cos^3 x\sqrt{2\sin 2x}}$ is equal to

A. $\sqrt{\tan x}+\frac{\tan^{5/2} x}{5}+C$

B. $\sqrt{\tan x}+\frac{2}{5}\tan^{5/2} x+C$

C. $2\sqrt{\tan x}+\frac{2}{5}\tan^{5/2} x+C$

D. None of the above

Answer: A

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52. Let $\int \frac{x^2}{\sqrt{1-x}}dx = p\sqrt{(1-x)}\left(3x^2+4x+8\right)$, then value of p is

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

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

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

D. None of these

Answer: A

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53. $\int \frac{dx}{x\sqrt{x^6-16}} =$

A. $\frac{1}{3}\sec^{-1}\left(\frac{x^3}{4}\right)+C$

B. $\cos^{-1}\left(\frac{x^3}{4}\right)+C$

C. $\frac{1}{12}\sec^{-1}\left(\frac{x^3}{4}\right)+C$

D. $\sec^{-1}\left(\frac{x^3}{4}\right)+C$

Answer: C

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54. $\int x^{51}\left(\tan^{-1}x+\cot^{-1}x\right)dx =$

A. $\frac{x^{52}}{52}\left(\tan^{-1}x+\cot^{-1}x\right)+C$

B. $\frac{x^{52}}{52}\left(\tan^{-1}x-\cot^{-1}x\right)+C$

C. $\frac{\pi x^{52}}{104}+\frac{\pi}{2}+C$

D. $\frac{x^{52}}{52}+\frac{\pi}{2}+C$

Answer: A

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55. The value of $\sqrt{2}\int\frac{\sin x}{\sin\left(x-\frac{\pi}{4}\right)}dx$, is

A. $x-\log\left|\cos\left(x-\frac{\pi}{4}\right)\right|\ |\ +C$

B. $x+\log\left|\cos\left(x-\frac{\pi}{4}\right)\right|+C$

C. $x-\log\left|\sin\left(x-\frac{\pi}{4}\right)\right|+C$

D. $x+\log\left|\sin\left(x-\frac{\pi}{4}\right)\right|+C$

Answer: D

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56. $\int \frac{\text{cosec x}}{\cos^2\left(1+\log\tan.\frac{x}{2}\right)}dx$ is equal to

A. $\sin^2\left[1+\log\tan.\frac{x}{2}\right]+C$

B. $\tan\left[1+\log\tan.\frac{x}{2}\right]+C$

C. $\sec^2\left[1+\log\tan.\frac{x}{2}\right]+C$

D. $-\tan\left[1+\log\tan.\frac{x}{2}\right]+C$

Answer: B

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57. $\int x(x^x)^x(2\log x+1)dx =$

A. $(x^x)^x + C$

B. $x^x + C$

C. $x^{\log x} + C$

D. None of these

Answer: A

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58. $\int \frac{x \tan^{-1} x}{(1+x^2)^{\frac{3}{2}}} dx$

A. $\frac{x - \tan^{-1} x}{1 - x^2} + C$

B. $\frac{x + \tan^{-1} x}{\sqrt{1 - x^2}} + C$

C. $\frac{x - \tan^{-1} x}{\sqrt{1 + x^2}} + C$

D. $\frac{x + \sqrt{1 - x^2}}{\sqrt{1 + x^2}} + C$

Answer: C

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59. $\int \tan\left(\sin^{-1} x\right) dx$ is equal to

A. $\frac{1}{\sqrt{1-x^2}} + C$

B. $\sqrt{1-x^2} + C$

C. $\frac{-x}{\sqrt{1-x^2}} + C$

D. $\frac{x}{\sqrt{1-x^2}} + C$

Answer: B

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60. $\int \frac{dx}{\cos x + \sqrt{3}\sin x} dx$ is equal to

A. $\frac{1}{2}\log\tan\left(\frac{x}{2}+\frac{\pi}{12}\right)+C$

B. $\frac{1}{2}\log\tan\left(\frac{x}{2}-\frac{\pi}{12}\right)+C$

C. $\log\tan\left(\frac{x}{2}+\frac{\pi}{12}\right)+C$

D. $\log\tan\left(\frac{x}{2}-\frac{\pi}{12}\right)+C$

Answer: A

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61. $\int\left(\sin^6 x+\cos^6 x+3\sin^2 x\cos^2 x\right)dx$ is equal to

A. $x+C$

B. $\frac{3}{2}\sin 2x+C$

C. $-\frac{3}{2}\cos 2x+C$

D. $\frac{1}{3}\sin 3x-\cos 3x+C$

Answer: A

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62. $\int \frac{dx}{\cos x - \sin x}$ is equal to

A. $\frac{1}{\sqrt{2}} \log \left| \tan \left(\frac{x}{2} - \frac{\pi}{8} \right) \right| + C$

B. $\frac{1}{\sqrt{2}} \log \left| \cot \left(\frac{x}{2} \right) \right| + C$

C. $\frac{1}{\sqrt{2}} \log \left| \tan \left(\frac{x}{2} - \frac{3\pi}{8} \right) \right| + C$

D. $\frac{1}{\sqrt{2}} \log \left| \tan \left(\frac{x}{2} + \frac{3\pi}{8} \right) \right| + C$

Answer: D

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63. $\int \left(\frac{x+2}{x+4} \right)^2 e^x dx$ is equal to

A. $e^x\left(\frac{x}{x+4}\right)+C$

B. $e^x\left(\frac{x+2}{x+4}\right)+C$

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

D. $\left(\frac{2xe^x}{x+4}\right)+C$

Answer: A

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64. The value of $\int\frac{x^2+1}{x^4-x^2+1}dx$ is

A. $\tan^{-1}\left(2x^2-1\right)+C$

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

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

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

Answer: D

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65. Let $f(x) = \frac{\sin^2 \pi x}{1 + \pi^x}$. Then, $\int [f(x) + f(-x)]dx$ is equal to

A. 0

B. $\frac{1}{2}x - \frac{\sin 2\pi x}{4\pi} + C$

C. $\frac{x}{2} - \frac{\cos \pi x}{2\pi} + C$

D. $\frac{1}{1 - \pi^x} \cdot \frac{\cos^2 \pi x}{2\pi} + C$

Answer: B

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66. The value of the $\int \frac{\sin x + \cos x}{3 + \sin 2x} dx$ is equal to

A. $\frac{1}{4}\log\left(\frac{2-\sin x+\cos x}{2+\sin x-\cos x}\right)+C$

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

C. $\frac{1}{4}\log\left(\frac{1\sin x}{1-\sin x}\right)+C$

D. None of these

Answer: A

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67. If $\int x f(x)dx = \frac{f(x)}{2}$, then $f(x)$ is equal to

A. e^x

B. e^{-x}

C. $\log x$

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

Answer: D

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68. $\int \frac{x^2-1}{x^3\sqrt{2x^4-2x^2+1}}dx$ is equal to

A. $2\sqrt{2-\frac{2}{x^2}+\frac{1}{x^4}}+C$

B. $2\sqrt{2+\frac{2}{x^2}+\frac{1}{x^4}}+C$

C. $\frac{1}{2}\sqrt{2-\frac{2}{x^2}+\frac{1}{x^4}}+C$

D. None of these

Answer: C

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69. $\int \sqrt{1+\sin\left(\frac{x}{4}\right)}dx$ is equal to

A. $8\left(\sin.\ \frac{x}{8}+\cos.\ \frac{x}{8}\right)+C$

B. $8\left(\sin.\ \frac{x}{8}-\cos.\ \frac{x}{8}\right)+C$

C. $8\left(\cos.\ \frac{x}{8}-\sin.\ \frac{x}{8}\right)+C$

D. $\frac{1}{8}\left(\sin.\ \frac{x}{8}-\cos.\ \frac{x}{8}\right)+C$

Answer: B

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70. $\int \frac{\cos 4x-1}{\cot x-\tan x}dx$ is equal to

A. $k=-1/2$

B. $k=-1/8$

C. $k=-1/4$

D. None of these

Answer: B

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71. $\int \cos^{-3/7} x \sin^{-11/7} x dx$ is equal to

A. $\log\left|\sin^{\frac{4}{7}} x\right| + C$

B. $\frac{4}{7}\tan^{4/7} x + C$

C. $-\frac{7}{4}\tan^{-4/7} x + C$

D. $\log\left|\cos^{3/7} x\right| + C$

Answer: C

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72. $\int \sqrt{e^x - 1} dx$ is equal to

A. $2\left[\sqrt{e^x-1}-\tan^{-1}\sqrt{e^x-1}\right]+C$

B. $\sqrt{e^x-1}-\tan^{-1}\sqrt{e^x-1}+C$

C. $\sqrt{e^x-1}+\tan^{-1}\sqrt{e^x-1}+C$

D. $2\left[\sqrt{e^x-1}+\tan^{-1}\sqrt{e^x-1}\right]+C$

Answer: A

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73. Let $f(x)=\int\frac{x^2}{(1+x^2)\left(1+\sqrt{1+x^2}\right)}dx$ and $f(0)=0$ then $f(1)$ is

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

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

C. $\log\left(1+\sqrt{2}\right)+\pi/4$

D. None of these

Answer: B

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74. $\int \frac{x^{49}\tan^{-1}(x^{50})}{(1+x^{100})}dx = k\left[\tan^{-1}(x^{50})\right]^2 + C,$, then k is equal to

A. $\frac{1}{50}$

B. $-\frac{1}{50}$

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

D. $-\frac{1}{100}$

Answer: C

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75. If $\int \frac{dx}{(x+100)\sqrt{x+99}} = f(x) + C$, then $f(x)$ is

A. $2(x+100)^{1/2}$

B. $3(x+100)^{1/2}$

C. $2\tan^{-1}\left(\sqrt{x+99}\right)$

D. $2\tan^{-1}\left(\sqrt{x+100}\right)$

Answer: C

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76. If $f(x) = cosx - \cos^2 x + \cos^3 x - \ldots. \to \infty$ then $\int f(x)dx$ is equal to

A. $\tan. \frac{x}{2} + C$

B. $x + \tan. \frac{x}{2} + C$

C. $x - \frac{1}{2}\tan. \frac{x}{2} + C$

D. $x - \tan. \frac{x}{2} + C$

Answer: D

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77. $\int \{1 + 2\tan x(\tan x + \sec x)\}^{1/2} dx$ is equal to

A. $\log(\sec x + \tan x) + C$

B. $\log(\sec x + \tan x)^{1/2} + C$

C. $\log \sec x(\sec x + \tan x) + C$

D. None of the above

Answer: C

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78. $\int x^2(ax+b)^{-2}dx$ is equal to

A. $\frac{2}{a^2}\left(x-\frac{b}{a}\log(ax+b)\right)+C$

B. $\frac{2}{a^2}\left(x-\frac{b}{a}\log(ax+b)\right)-\frac{x^2}{a(ax+b)}+C$

C. $\frac{2}{a^2}\left(x+\frac{b}{a}\log(ax+b)\right)+\frac{x^2}{a(ax+b)}+C$

D. $\frac{2}{a^2}\left(x+\frac{b}{a}\log(ax+b)\right)-\frac{x^2}{a(ax+b)}+C$

Answer: B

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Mht Cet Corner

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

A. $\frac{1}{3}\sin^{-1}\left(\frac{x-1}{3}\right)+c$

B. $\sin^{-1}\left(\frac{x+1}{3}\right)+c$

C. $\frac{1}{3}\sin^{-1}\left(\frac{x+1}{3}\right)+c$

D. $\sin^{-1}\left(\frac{x-1}{3}\right)+c$

Answer: D

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2. $\int\left(\frac{4e^x-25}{2e^x-5}\right)dx = Ax + B\frac{\log}{2e^x} - \frac{5}{+c}$ then

A. A = 5 and B = 3

B. A = 5 and B = -3

C. A = -5 and B = 3

D. A = -5 and B = -3

Answer: B

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

A. $\log a.\ a^{x+\tan^{-1}x}+c$

B. $\frac{\left(x+\tan^{-1}x\right)}{\log a}+c$

C. $\frac{a^{x+\tan^{-1}x}}{\log a}+c$

D. $\log a\left(x+\tan^{-1}x\right)+c$

Answer: C

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4. If $\int \frac{f(x)}{\log(\sin x)} dx = \log[\log \sin x] + c$, then f(x) is equal to

A. $\cot x$

B. $\tan x$

C. $\sec x$

D. $\text{cosec } x$

Answer: A

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5. The value of $\int \frac{dx}{x(x^n + 1)}$ is equal to

A. $\frac{1}{n} \log\left(\frac{x^n}{x^n + 1}\right) + C$

B. $\log\left(\frac{x^n + 1}{x^n}\right) + C$

C. $\frac{1}{n} \log\left(\frac{x^n + 1}{x^n}\right) + C$

D. $\log\left(\frac{x^n}{x^n+1}\right)+C$

Answer: A

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6. The value of $\int\cos(\log x)dx$ is

A. $\frac{1}{2}[\sin(\log x)+\cos(\log x)]+C$

B. $\frac{x}{2}[\sin(\log x)+\cos(\log x)]+C$

C. $\frac{x}{2}[\sin(\log x)-\cos(\log x)]+C$

D. $\frac{1}{2}[\sin(\log x)-\cos(\log x)]+C$

Answer: B

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7. The value of $\int e^x \left[\frac{1+\sin x}{1+\cos x}\right] dx$ is equal to

A. $\frac{1}{2}e^x \sec.\ \frac{x}{2} + C$

B. $e^x \sec.\ \frac{x}{2} + C$

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

D. $e^x \tan.\ \frac{x}{2} + C$

Answer: D

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8. The value of $\int \frac{1}{3\sin x - \cos x + 3} dx$ is equal to

A. $\log\left(\frac{\tan.\ \frac{x}{2}+1}{2\tan.\ \frac{x}{2}+1}\right) + C$

B. $\frac{1}{2}\log\left(\frac{2\tan.\ \frac{x}{2}+1}{\tan.\ \frac{x}{2}+1}\right) + C$

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

D. $2\log\left(\frac{2\tan.\frac{x}{2}+1}{\tan.\frac{x}{2}+1}\right)+C$

Answer: C

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9. $\int\frac{\sin 2x}{\sin^4 x+\cos^4 x}dx$

A. $\tan^{-1}\left(\cot^2 x\right)+C$

B. $-\tan^{-1}(\cos 2x)+C$

C. $\tan^{-1}(\sin 2x)+C$

D. $\tan^{-1}\left(\tan^2 x\right)+C$

Answer: B

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10. The value of $\int \sqrt{1+\sec x}\,dx$ is equal to

A. $\sin^{-1}(\sqrt{2}\sin x)+C$

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

C. $2\sin^{-1}(\sqrt{2}\sin x)+C$

D. $2\sin^{-1}\left(\frac{\sqrt{2}x}{2}\right)+C$

Answer: B

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11. The value of $\int \frac{(x^2+1)}{x^4+x^2+1}dx$ is equal to

A. $\frac{1}{\sqrt{3}}\tan^{-1}\left\{\frac{x-1/x}{\sqrt{3}}\right\}+C$

B. $\frac{1}{2\sqrt{3}}\log\left\{\frac{(x-1/x)-\sqrt{3}}{(x-1/x)+\sqrt{3}}\right)\right\}+C$

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

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

Answer: A

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12. $\int\left(\sqrt{\tan x}+\sqrt{\cot x}\right)dx$ is equal to

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

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

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

D. $\frac{\tan x}{\sqrt{2}}.\tan^{-1}\left(\frac{\cot x+1}{\sqrt{2\tan x}}\right)+C$

Answer: B

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13. $\int \frac{x^2}{(x\sin x+\cos x)^2}dx$ is equal to

A. $\frac{\sin x+\cos x}{x\sin x+\cos x}+C$

B. $\frac{x\sin x-\cos x}{x\sin x+\cos x}+C$

C. $\frac{\sin x-x\cos x}{x\sin x+\cos x}+C$

D. None of these

Answer: C

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14. If $f(x)=x, g(x)=\sin x,$ then $\int f(g(x))dx$ is equal to

A. $\sin x+C$

B. $-\cos x+C$

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

D. $x \sin x + C$

Answer: B

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15. $\int e^{\tan x}\left(\sec^2 x + \sec^3 x \sin x\right) dx$ is equal to

A. $\sec x e^{\tan x} + C$

B. $\tan x e^{\tan x} + C$

C. $e^{\tan x} + \tan x + C$

D. $(1 + \tan x) e^{\tan x} + C$

Answer: B

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16. $\int \frac{1}{16x^2+9} dx$ is equal to

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

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

C. $\frac{1}{12}\tan^{-1}\left(\frac{4x}{3}\right)+C$

D. $\frac{1}{12}\tan^{-1}\left(\frac{3x}{4}\right)+C$

Answer: C

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17. $\int [\sin(\log x)+\cos(\log x)]dx$

A. $a\cos(\log x)+C$

B. $\cos(\log x)+C$

C. $x\sin(\log x)+C$

D. $\sin(\log x) + C$

Answer: C

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18. $\int e^x \frac{(x-1)}{x^2} dx$ is equal to

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

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

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

D. $\frac{-e^x}{x} + C$

Answer: C

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19. $\int x \log x dx$ is equal to

A. $\frac{x^2}{4}(2\log x - 1) + C$

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

C. $\frac{x^2}{4}(2\log x + 1) + C$

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

Answer: A

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20. $\int \frac{x^{e-1} + e^{x-1}}{x^2 + e^x}$ dx is equal to

A. $\log(x^e + e^x) + C$

B. $e\log(x^e + e^x) + C$

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

D. None of these

Answer: C

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21. $\int \frac{x + \sin x}{1 + \cos x} dx$ is equal to

A. $x \tan. \frac{x}{2} + C$

B. $\log(1 + \cos x) + C$

C. $\cot. \frac{x}{2} + C$

D. $\log(x + \sin x) + C$

Answer: A

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22. $\int \cos^3 x e^{\log(\sin x)}\, dx$ is equal to

A. $\frac{-\sin n^4 x}{4} + C$

B. $-\frac{\cos^4 x}{4} + C$

C. $\frac{e^{\sin x}}{4} + C$

D. None of these

Answer: B

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23. $\int \sqrt{\frac{x-1}{x+1}} dx$ is equal to

A. $2\sqrt{x^2+1} + \sin^{-1} x + C$

B. $\sqrt{x^2-1} - \sin^{-1} x + C$

C. $\sqrt{x^2-1} + \sin^{-1} x + C$

D. $\frac{\sqrt{x^2-1}}{2}+\sin^{-1}x+C$

Answer: B

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24. If $l_1=\int\sin^{-1}xdx$ and $l_2=\int\sin^{-1}\sqrt{1-x^2}dx$, then

A. $l_1=l_2$

B. $l_2=\frac{\pi}{2}l_1$

C. $l_1+l_2=\frac{\pi}{2}x$

D. $l_1+l_2=\frac{\pi}{2}$

Answer: C

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25. $\int \frac{(\sin\theta + \cos\theta)}{\sqrt{\sin 2\theta}} d\theta$ is equal to

A. $\log\left|\cos\theta - \sin\theta + \sqrt{\sin 2\theta}\right| + C$

B. $\log\left|\sin\theta - \cos\theta + \sqrt{\sin 2\theta}\right| + C$

C. $\sin^{-1}(\sin\theta + \cos\theta) + C$

D. $\sin^{-1}(\sin\theta + \cos\theta) + C$

Answer: C

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26. What is the value of $\int (\sqrt{x} + x)^{-1} dx$?

A. $\frac{1}{2}\log(1 + \sqrt{x}) + C$

B. $2\log(1 + \sqrt{x}) + C$

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

D. $3\log\left(1+\sqrt{x}\right)+C$

Answer: B

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27. Evaluate $\int(1-\cos x)\operatorname{cosec}^2 x\,dx$

A. $\tan.\ \frac{x}{2}+C$

B. $-\cot.\ \frac{x}{2}+C$

C. $2\tan.\ \frac{x}{2}+C$

D. $-2\cot.\ \frac{x}{2}+C$

Answer: A

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28. The value of $\int \frac{x^2}{1+x^6} dx$ is equal to

A. $x^3 + C$

B. $\frac{1}{3}\tan^{-1}(x^3) + C$

C. $\log(1 + x^3)$

D. None of these

Answer: B

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29. $\int \frac{\cos x}{\sqrt{1+\sin x}} dx$ is equal to

A. $\text{sin.}\frac{x}{2} - \text{cos.}\frac{x}{2} + C$

B. $\text{sin.}\frac{x}{2} + \text{cos.}\frac{x}{2} + C$

C. $2\left[\text{sin.}\frac{x}{2} - \text{cos.}\frac{x}{2}\right] + C$

D. $2\left[\sin.\ \frac{x}{2}+\cos.\ \frac{x}{2}\right]+C$

Answer: D

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30. $\int \frac{1}{\sin^2 x.\cos^2 x}dx$ is equal to

A. $\sin x-\cos x+C$

B. $\tan x+\cot x+C$

C. $\cos x+\sin x+C$

D. $\tan x-\cot x+C$

Answer: D

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