MATHS

BOOKS - OBJECTIVE RD SHARMA ENGLISH

INDEFINITE INTEGRALS

Illustration

1. If $\int \frac{\sin^8 x - \cos^8 x}{1 - 2\sin^2 x \cos^2 x} dx = a \sin 2x + C$, then $a =$ $-1/2$ (b) $1/2$ (c) -1 (d) 1

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

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

C. -1

D. 1

Answer: A

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2. If $\int \frac{1+\cos 8x}{\tan 2x - \cot 2x} dx = k \cos 8x + C$, then k equals

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

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

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

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

Answer: C

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3. $\int \frac{\sin x + \cos x}{\sin(x-\alpha)} dx$ is equal to

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

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

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

D. none of these

Answer: A

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4. $\int \frac{\sin x}{\sin(x-\alpha)} dx = Ax + B\log(\sin(x-\alpha)) + C$ then find out (A, B)

A. $(-\cos\alpha, \sin\alpha)$

B. $(\cos\alpha, \sin\alpha)$

C. $(-\sin\alpha, \cos\alpha)$

D. $(\sin\alpha, \cos\alpha)$

Answer: B

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5. Evaluate: $\int \frac{1}{\sin(x-a)\sin(x-b)}\,dx$

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

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

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

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

Answer: A

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

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

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

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

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

Answer: A

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7. If $\int \frac{\cos^4 x}{\sin^2 x} dx = A\cot x + B\sin 2x + \frac{C}{2}x + D$, then

A. $A = -2, B = 1/4$

B. $B = -1/4, C = -3$

C. $B = 1/4, C = -3$

D. none of these

Answer: b

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8. If $I = \int \frac{\cos 2x - \cos 2\alpha}{\sin a - \sin \alpha} dx$,then I equals

A. $2\sin x - x\cos\alpha + C$

B. $2\cos x - 2x\sin\alpha + C$

C. $2\cos x + 2\sin\alpha + C$

D. $2\sin x + x\cos\alpha + C$

Answer: b

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9. $\int \tan x \tan 2x \tan 3x dx$ is equal to

A. $\frac{1}{3}\log|\sec 3x| - \frac{1}{2}\log|\sec 2x| + \log|\sec x| + C$

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

C. $\frac{1}{3}\log|\sec 3x| + \frac{1}{2}\log|\sec 2x| + \log|\sec x| + C$

D. none of these

Answer: B

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10. $\int e^x(1+x)\sec^2(xe^x)dx = f(x) +$ 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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11. Evaluate $\int e^{3\log x}\left(x^4+1\right)^{-1}dx$

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

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

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

D. none of these

Answer: B

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12. The primitive of the function $f(x) = \left(1 - \frac{1}{x^2}\right) a^{x + \frac{1}{x}}$, $a > 0$ is

(a) $\frac{a^{x + \frac{1}{x}}}{(\log)_e a}$

(b) $(\log)_e a \dot{a}^{x + \frac{1}{x}}$

(c) $\frac{a^{x + \frac{1}{x}}}{x} (\log)_e a$

(d) $x \frac{a^{x + \frac{1}{x}}}{(\log)_e a}$

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

B. $a^{x + \frac{1}{x}} \log_e a$

C. $\frac{a^{x + \frac{1}{x}}}{x} \log_e a$

D. $\frac{a^{x + \frac{1}{x}}}{\log_e a}$

Answer: A

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

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

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

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

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

Answer: A

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14. If $\int \frac{2^{1/x}}{x^2} dx = a2^{1/x} + C$, then a=

A. $-\log_2 e$

B. $-\log_e 2$

C. -1

D. $1/2$

Answer: A

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15. $\int x^2 e^{x^3} \cos\left(e^{x^3}\right) dx$ is equalto

A. $\sin\left(e^{x^3}\right) + C$

B. $3\sin\left(e^{x^3}\right) + C$

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

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

Answer: C

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16. $\int \sin x d(\cos x)$ is equal to

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

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

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

D. none of these

Answer: B

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17. Evaluate: $\int \left(x + \frac{1}{x}\right)^{\frac{3}{2}} \left(\frac{x^2 - 1}{x^2}\right) dx$

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

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

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

D. none of these

Answer: B

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18. $\int 3\sqrt{\frac{\sin^n x}{\cos^{n+6} x}}dx$

A. $\frac{3}{n+3}\tan^{n/3+1} x + C$

B. $\frac{3}{n+3}\tan^{n/3+1} x + C$

C. $\frac{3}{n+1}\tan^{n/3+1} x + C$

D. none of these

Answer: B

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19. The value of $\int \frac{1}{x^2(x^4+1)^{3/4}}$ dx is equal to

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

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

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

D. none of these

Answer: B

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20. If $\int \frac{\sqrt{5+x^{10}}}{x^{16}}dx = a\left(1+\frac{5}{x^{10}}\right)^{3/2} + C$,then a=

A. $-\frac{1}{25}$

B. $\frac{1}{75}$

C. $-\frac{1}{75}$

D. $-\frac{1}{150}$

Answer: C

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

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

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

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

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

Answer: c

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

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

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

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

D. none of these

Answer: a

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23. If $I = \int \frac{dx}{(a^2 - b^2x^2)^{3/2}}$, then I equals

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

B. $\frac{x}{a^2\sqrt{a^2 - b^2x^2}} + C$

C. $\frac{ax}{\sqrt{a^2 - b^2x^2}} + C$

D. none of these

Answer: b

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24. $\int \frac{\left(\tan^{-1} x\right)^3}{1 + x^2} dx$ is equal to a) $3\left(\tan^{-1} x\right)^2 + C$ b) $\frac{1}{4}\left(\tan^{-1} x\right)^4 + C$ c) $\left(\tan^{-1} x\right)^4 + C$ d) none of these

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

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

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

D. none of these

Answer: B

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25.

Let $I_n=\int\tan^n x dx,(n>1).\ I_4+I_6=a\tan^5 x+bx^5+C,$ where C is a

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

B. $\left(-\frac{1}{5},0\right)$

C. $\left(-\frac{1}{5},1\right)$

D. $\left(\frac{1}{5},0\right)$

Answer: d

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26. If $\int \sin^5 x \cos^4 x dx = A \cos^9 x + B \cos^7 x + C \cos^5 x + D$,then 9A +7B +5C=

A. 1

B. 0

C. -1

D. none of these

Answer: b

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27. If $\int \cos^7 x dx = A \sin^7 x + B \sin^5 x + C \sin^3 x + \sin x + k$, then

A. $A = \frac{1}{7}, B = \frac{3}{5}, C = -1$

B. $A = -\frac{1}{7}, B = \frac{3}{5}, C = -1$

C. $A = \frac{-1}{7}, B = \frac{1}{5}, C = -1$

D. $A = \frac{1}{7}, B = \frac{3}{5}, C = 1$

Answer: b

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28. If $\int \frac{\sin^4 x}{\cos^8 x} dx = a \tan^7 x + b \tan^5 x + C$, then

A. 7a = 5b

B. 5a = 7b

C. 7a + 5b = 0

D. 5a + 7b = 0

Answer: a

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29. If $\int \frac{dx}{\sqrt{\sin^3 x \cos^5 x}} = a\sqrt{\cot x} + b\sqrt{\tan^3 x} + c$, then

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

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

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

D. none of these

Answer: a

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30. Evaluate: $\int \sec^{4/3} x \quad \operatorname{cosec}^{8/3} x dx$

A. 3

B. -3

C. 0

D. -1

Answer: c

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31. The value of $\int \frac{\sin x + \cos x}{3 + \sin 2x} dx$, is

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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32. If $\int \sqrt{\frac{x}{a^3 - x^3}} dx = m \sin^{-1}\left(\frac{x}{a}\right)^n + C$, then

A. m = n

B. m =-n

C. $m = 1/n$

D. $m = -1/n$

Answer: c

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33. If $\int \sqrt{\frac{x^4}{a^6 + x^6}} dx = g(x) + C$,then g (x)=

A. $\frac{1}{3}\log\left|x^3 - \sqrt{a^6 + x^6}\right|$

B. $\log\left|x^3 + \sqrt{a^6 + x^6}\right|$

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

D. none of these

Answer: c

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34. If $\int \frac{1}{x^2+2x+2}dx = f(x)+C$, then f (x)=

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

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

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

D. $3\tan^{-1}(x+1)$

Answer: A

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35. $\int \frac{dx}{x(x^7+1)}$ is equal to

A. $\log\left(\frac{x^7}{x^7+1}\right)+C$

B. $\frac{1}{7}\log\left(\frac{x^7}{x^7+1}\right)+C$

C. $\log\left(\frac{x^7+1}{x^7}\right)+C$

D. $\frac{1}{7}\log\left(\frac{x^7+1}{x^7}\right)+C$

Answer: B

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

A. $\log\left(x^2+4x+13\right)+C$

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

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

D. $\frac{2x+4}{\left(x^2+4x+13\right)^3}+C$

Answer: B

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37. If $\int \frac{1}{\sqrt{2ax-x^2}}dx = fog(x)+C$, then

A. $f(x)=\sin^{-1}x,$ and $g(x)=\frac{x+a}{a}$

B. $f(x) = \sin^{-1} x, \text{ and } g(x) = \dfrac{x-a}{a}$

C. $f(x) = \cos^{-1} x, \text{ and } g(x) = \dfrac{x-a}{a}$

D. $f(x) = \tan^{-1} x \text{ and } g(x) = \dfrac{x-a}{a}$

Answer: B

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38. Evaluate: $\int \left(\sqrt{\tan x} + \sqrt{\cot x}\right) dx$

A. $\sin^{-1}(\sin x - \cos c) + C$

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

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

D. none of these

Answer: b

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39. Evaluate: $\int \frac{4x+1}{x^2+3x+2}dx$

A. a = b

B. a + b =4

C. a = 2b

D. b = 2a

Answer: B

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

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

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

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

D. none of these

Answer: c

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41. If $\int \frac{1}{a^2 \sin^2 x + b^2 \cos^2 x} dx = \frac{1}{12} \tan^{-1}(3 \tan x) + C$, then the value of ab , is

A. 41

B. 12

C. 39

D. 36

Answer: B

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42. $\int \frac{1}{1 + 3 \sin^2 x} dx$

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

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

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

D. none of these

Answer: b

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43. $\int \frac{1}{7 + 5\cos x} dx =$

A. $\frac{1}{\sqrt{6}}\tan^{-1}\left(\frac{1}{\sqrt{6}}\tan\frac{x}{2}\right) + C.$

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

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

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

Answer: a

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44. $\int \frac{1}{\cos x + \sqrt{3}\sin x}$ dx equals

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

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

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

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

Answer: c

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

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

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

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

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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46. $\int\frac{1}{\sin x-\cos x+\sqrt{2}}dx$ equals

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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47. If $\int \frac{3\sin x + 2\cos x}{3\cos x + 2\sin x} dx = ax + b\log_e |2\sin x + 3\cos x| + c$ then a. $a = -\frac{12}{13}$ b. $b = \frac{6}{13}$ c. $a = \frac{12}{13}$ d. $b = -\frac{15}{39}$

A. $a = \frac{5}{13}, b = -\frac{12}{13}$

B. $a = \frac{12}{13}, b = -\frac{5}{13}$

C. $a = \frac{12}{13}, b = \frac{5}{13}$

D. $a = \frac{-12}{5}, b = \frac{-5}{13}$

Answer: b

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48. $\int \frac{\sin x + 8\cos x}{4\sin x + 6\cos x} dx =$

A. $x + \frac{1}{2}\log|4\sin x + 6\cos x| + C$

B. $2x + \log|2\sin x + 3\cos x| + C$

C. $x + 2\log|2\sin x + 3\cos x| + C$

D. $\frac{1}{2}\log|4\sin x + 6\cos x| + C$

Answer: a

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49. Evaluate: $\int \tan^{-1}\sqrt{\frac{1-x}{1+x}}dx$

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

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

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

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

Answer: a

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

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

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

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

D. none of these

Answer: b

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51. $\int \{\sin(\log_e x) + \cos(\log_e x)\} dx$ is equal to

A. $\sin(\log_e x) + \cos(\log_e x) + C$

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

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

D. none of these

Answer: b

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52. Evaluate $\int\left(\log(\log x)+\frac{1}{(\log x)^2}\right)dx.$

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

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

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

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

Answer: a

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

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

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

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

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

Answer: c

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

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

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

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

D. none of these

Answer: D

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55. $\int (x+1)^2 e^x dx$ is equal to

A. $xe^x + C$

B. $x^2 e^x + C$

C. $(x+1)e^x + C$

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

Answer: D

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56. $\int e^x \left(1 - \cot x + \cot^2 x\right) dx$ is eqal to

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

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

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

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

Answer: B

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57. Evaluate $\int\left(\frac{\log x-1}{1+(\log x)^2}\right)^2 dx$

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

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

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

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

Answer: A

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58. Evaluate: $\int e^x\left(\frac{1-\sin x}{1-\cos x}\right)dx$

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

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

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

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

Answer: c

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59. If $u = \int e^{ax} \sin \text{ bx dx and } v = \int e^{ax} \cos \text{ bx dx then } (u^2 + v^2)(a^2 + b^2)$

A. $2e^{ax}$

B. e^{2ax}

C. $2e^{2ax}$

D. bxe^{ax}

Answer: b

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60. If $u = \int e^{ax} \sin \text{ bx dx and } v = \int (e^{ax}) \cos \text{ bx dx,then } \tan^{-1}\left(\frac{u}{v}\right) + \tan^{-1}\left(\frac{b}{a}\right)$ equals

A. bx

B. 2 bx

C. b^2x^2

D. $\sqrt{bx}$

Answer: a

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61. If $\int \frac{x^2+4}{x^4+16}dx = \frac{1}{k}\tan^{-1}\left(\frac{x^2-4}{kx}\right)+c$ then $k=$ (i) $\sqrt{2}$ (ii)$4\sqrt{2}$ (iii)$2\sqrt{2}$ (iv) 2

A. 4

B. $2\sqrt{2}$

C. 2

D. $\sqrt{2}$

Answer: b

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62. Evaluate: $\int \frac{1}{\cos^6 x + \sin^6 x} dx$

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

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

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

D. none of these

Answer: c

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63. If $I = \int \frac{e^x}{e^{4x} + e^{2x} + 1} dx. J = \int \frac{e^{-x}}{e^{-4x} + e^{-2x} + 1} dx.$ Then for an arbitrary constant c, the value of $J - I$ equal to

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

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

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

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

Answer: c

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Solved Example

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

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

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

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

D. none of these

Answer: b

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2. $\int \frac{1}{\sqrt{x^2+2}} d\left(x^2+1\right)$ is equal to

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

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

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

D. none of these

Answer: A

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3. Integration of f (x) $=\sqrt{1+x^2}$ with respect to x^2, is

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

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

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

D. none of these

Answer: B

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4. The value of $\int \frac{dx}{x\sqrt{1-x^3}}$ is equal to

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

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

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

D. none of these

Answer: a

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5. If $\int \frac{\sqrt{\cot x}}{\sin x \cos x}dx = P\sqrt{\cot x}+Q$, then P equals

A. 1

B. 2

C. -1

D. -2

Answer: D

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

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

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

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

D. none of these

Answer: b

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7. $\int x^x(1+\log_e x)\text{dx}$ is equal to

A. $x^x \log_e x + C$

B. $ex^x + C$

C. $x^x + C$

D. none of these

Answer: c

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8. The value of $\int \frac{dx}{x^{\frac{1}{5}}\left(1+x^{\frac{4}{5}}\right)^{\frac{1}{2}}}$ is

A. $\sqrt{1+x^{4/5}} + C$

B. $\frac{5}{2}\sqrt{1+x^{4/5}} + C$

C. $x^{4/5}\sqrt{1+x^{4/5}} + C$

D. none of these

Answer: b

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9. Evaluate: $\int \frac{x^{\frac{5}{2}}}{\sqrt{1+x^7}} dx$

A. $\frac{2}{7}\log\left|x^{7/2}+\sqrt{1+x^7}\right|+C$

B. $\frac{1}{2}\log\left|\frac{x^7+1}{x^7-1}\right|+C$

C. $2\sqrt{1+x^7}+C$

D. none of these

Answer: a

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10. $\int 7^{7^{7^x}} \cdot 7^{7^x} \cdot 7^x \, dx =$

A. $\frac{7^{7^{7^x}}}{(\log_e 7)^3} + C$

B. $\frac{7^{7^{7^x}}}{(\log_e 7)^2} + C$

C. $7^{7^{7^x}} \cdot (\log 7)^3 + C$

D. none of these

Answer: A

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11. The value of $\int \frac{1}{\sin\left(x - \frac{\pi}{3}\right)\cos x} dx$, is

A. $2\log|\sin x + \sin \cdot (x - \pi/3)| + C$

B. $2\log\left|\sec x \sin\left(x - \frac{\pi}{3}\right)\right| + C$

C. $2\log\left|\sin x - \sin\left(x - \frac{\pi}{3}\right)\right| + C$

D. none of these

Answer: b

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12. Evaluate: $\int \frac{\log\left(x+\sqrt{1+x^2}\right)}{\sqrt{1+x^2}}dx$.

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

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

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

D. none of these

Answer: b

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

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

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

C. $\log_e\left|\frac{\sqrt{1+x}-1}{\sqrt{1+x}+1}\right|+C$

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

Answer: a

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14. $\int\frac{1+\cos 4x}{\cot x-\tan x}dx$

A. $A=\frac{1}{8}, B\in R$

B. $A=-\frac{1}{8}, B\in R$

C. $A=\frac{1}{4}, B\in R$

D. none of these

Answer: b

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15. Evaluate: $\int \frac{x^7}{(1-x^2)^5}\,dx$.

A. $\frac{x^8}{(1-x^2)^4}+C$

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

C. $\frac{1}{8}\frac{x^4}{(1-x^2)^4}+C$

D. none of these

Answer: B

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16. If $\int f(x)\sin x\cos x dx = \frac{1}{2(b^2-a^2)}\ln f(x)+c$,then f(x) is equal to

A. $\frac{1}{a^2\sin^2 x+b^2\cos^2 x}$

B. $\frac{1}{a^2\sin^2 x-b^2\cos^2 x}$

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

D. $\frac{1}{a^2\cos^2 x-b^2\sin^2 x}$

Answer: a

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

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

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

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

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

Answer: a

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18. If $\int \frac{\cos x-\sin x}{\sqrt{8-\sin 2x}}dx=\sin^{-1}\left(\frac{\sin x+\cos x}{a}\right)+C$ then a =

A. 2

B. 3

C. 4

D. none of these

Answer: b

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19. Evaluate $\int\left(3x^2\tan\frac{1}{x}-x\sec^2\frac{1}{x}\right)dx.$

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

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

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

D. none of these

Answer: A

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20. If $\int x \log\left(1+\frac{1}{x}\right)dx$

$= f(x).\log_e(x+1) + g(x)\log_e x + Lx + C$, then

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

B. $g(x) = \log_e x$

C. L = 1

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

Answer: d

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21. $\int \frac{e^{(x^2+4Inx)} - x^3 e^{x^2}}{x-1}dx$ equals to

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

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

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

D. none of these

Answer: d

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22. The value of the integral $\int \frac{x \sin x^2 e^{\sec x^2}}{\cos^2 x^2} dx$, is

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

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

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

D. none of these

Answer: a

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23. $\int \frac{1}{(x-1)\sqrt{x^2-1}} dx$ equals

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

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

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

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

Answer: d

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24. $\int\sqrt{x-3}\left(\sin^{-1}(Inx)+\cos^{-1}(Inx)\right)dx$ is equal to

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

B. 0

C. does not exist

D. none of these

Answer: c

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25. $\int \frac{1-x^7}{x(1+x^7)}dx$ equals

A. $a=1, b=\frac{2}{7}$

B. $a=-1, b=\frac{2}{7}$

C. $a=1, b=-\frac{2}{7}$

D. $a=-1, b=-\frac{2}{7}$

Answer: c

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26. Evaluate: $\frac{\sin^3 x dx}{(\cos^4 x+3\cos^2 x+1)\tan^{-1}(\sec x+\cos x)}$

A. $\tan^{-1}(\sec x+\cos x)+C$

B. $\log_e\left|\tan^{-1}(\sec x+\cos x)\right|+C$

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

D. none of these

Answer: b

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27. $\int \frac{\left(x - x^5\right)^{1/5}}{x^6} dx$ is equal to :

A. $\frac{5}{24}\left(\frac{1}{x^4} - 1\right)^{6/5} + C$

B. $\frac{5}{24}\left(1 - \frac{1}{x^4}\right)^{6/5} + C$

C. $-\frac{5}{24}\left(1 - \frac{1}{x^4}\right)^{6/5} + C$

D. none of these

Answer: C

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

A. $\log_e\left(\tan^2 x+\sqrt{1+\tan^4 x}\right)+C$

B. $\frac{1}{2}\log_e\left(\tan^2 x+\sqrt{1+\tan^4 x}\right)+C$

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

D. none of these

Answer: b

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29. If $\int\sqrt{\frac{\cos^3 x}{\sin^{11} x}}dx=-2\left(A\tan^{-\frac{9}{2}}+B\tan^{-\frac{5}{2}}x\right)+C$, find then find A and B.

A. $A=\frac{1}{9}, B=-\frac{1}{5}$

B. $A=\frac{1}{9}, B=\frac{1}{5}$

C. $A=-\frac{1}{9}, B=\frac{1}{5}$

D. none of these

Answer: b

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30. $\int\left(\frac{f(x)g'(x)-f'(x)g(x)}{f(x)g(x)}\right)(\log(g(x))-\log(f(x)))dx$ is equal to:

A. $\log_e\left\{\frac{g(x)}{f(x)}\right\}+C$

B. $\frac{1}{2}\left\{\log_e\frac{g(x)}{f(x)}\right\}^2+C$

C. $\frac{g(x)}{f(x)}\log_e\frac{g(x)}{f(x)}+C$

D. none of these

Answer: b

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31. $\int\left(\frac{f(x)g'(x)-f'(x)g(x)}{f(x)g(x)}\right)(\log(g(x))-\log(f(x)))dx$ is equal to:

A. $f(x)g(x)\log\{f(x)g(x)\}+C$

B. $\frac{1}{2}[\log\{f(x)g(x)\}]^2+C$

C. $[\log\{f(x)g(x)\}]^2 + C$

D. $\log\{f(x)g(x)\} + C$

Answer: b

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32. $\int (x^x)^x (2x \log_e x + x) dx$ is equal to

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

B. $(x^x) + C$

C. $x^x . \log_e x + C$

D. none of these

Answer: b

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33. Let the equation of a curve passing through the point (0,1) be given b $y = \int x^2 e^{x^3} dx$. If the equation of the curve is written in the form $x = f(y)$, then f(y) is

A. $\sqrt{\log_e(3y-2)}$

B. $\sqrt[3]{\log_e(3y-2)}$

C. $\sqrt[3]{\log_e(2-3y)}$

D. none of these

Answer: b

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34. Evaluate: $\int \frac{1}{\sin^4 x + \cos^4 x} dx$

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

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

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

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

Answer: a

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35. Evaluate the following Integrals :

$$\int\frac{\sec x.\,dx}{\sqrt{\sin(x+2A)+\sin A}}$$

A. $\sqrt{\sec\alpha(\tan x+\tan\alpha)}+C$

B. $\sqrt{2\sec\alpha(\tan x-\tan\alpha)}+C$

C. $\sqrt{2\sec\alpha(\tan\alpha-\tan\alpha)}+C$

D. none of these

Answer: a

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36. Let $\int e^x\{f(x)-f'(x)\}dx=\phi(x)$. Then $\int e^x f(x)dx$ is

A. $\phi(x)+e^x f(x)$

B. $\phi(x)-e^x f(x)$

C. $\frac{1}{2}\{\phi(x)-e^x f'(x)\}$

D. $\frac{1}{2}\{\phi(x)+e^x f'(x)\}$

Answer: c

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37. Evaluate if $\int\frac{1}{x+x^5}dx=f(x)+c$, then $\int\frac{x^4}{x+x^5}dx$.

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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38. If $\int f(x)dx = F(x)$, then $\int x^3 f(x^2)dx$ is equal to

A. $\frac{1}{2}\left[x^2\{F(x)\}^2 - \int\{F(x)\}^2 dx\right]$

B. $\frac{1}{2}\left[x^2 F(x^2) - \int F(x^2)d(x^2)\right]$

C. $\frac{1}{2}\left[x^2 F(x) - \frac{1}{2}\int\{F(x)\}^2 dx\right]$

D. none of these

Answer: b

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39. If n is an odd positive integer, then $\int |x^n| dx$ is equal to

A. $\left|\frac{x^{n+1}}{n+1}\right| + C$

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

C. $\frac{|x^n|}{n+1}+C$

D. none of these

Answer: c

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40. If $\int e^{ax}\cos bxdx=\frac{e^{2x}}{29}f(x)+C$, then f'' (x)=

A. 29 f (x)

B. $-29f(x)$

C. 25 f(x)

D. $-25f(x)$

Answer: d

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

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

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

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

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

Answer: c

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42. If $\int f(x)dx = 2\{f(x)\}^3 + C$, then f (x) is

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

B. x^3

C. $\frac{1}{\sqrt{x}}$

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

Answer: d

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43. Let g (x) be a differentiable function satisfying $\frac{d}{dx}\{g(x)\} = g(x)$ and $g(0) = 1$, then $\int g(x)\left(\frac{2-\sin 2x}{1-\cos 2x}\right)dx$ is equal to

A. $g(x)\cot x + C$

B. $-g(x)\cot x + C$

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

D. none of these

Answer: b

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44. If $\int g(x)dx = g(x)$, then the value of the integral $\int f(x)g(x)\{f(x) + 2f'(x)\}dx$ is

A. f (x) g(x) +C

B. $\{f(x)\}^2 g(x) + C$

C. $\{f(x) - f'(x)\}g(x) + C$

D. $\{f(x)\}^2 g(x) + C$

Answer: b

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45. If $\int \frac{dx}{1 - \sin^4 x} = a\tan x + b\tan^{-1}(c\tan x) + D$, then:

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

B. $A = \sqrt{2}$ and $f(x) = \sqrt{2}\tan x$

C. $A = -\sqrt{2}$ and $f(x) = \sqrt{2}\tan x$

D. none of these

Answer: a

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

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

B. $\cos^2 x . \log_e \cos x + C$

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

D. none of these

Answer: c

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47. Let f(x) be a polynomial of degree three $f(0) = -1$ and $f(1) = 0$. Also, 0 is a stationary point of $f(x)$. If f(x) does not have an extremum at $x = 0$, then the value of integral $\int \frac{f(x)}{x^3 - 1} dx$, is

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

B. x+C

C. $\frac{x^3}{6} + C$

D. nome of these

Answer: b

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48. $\int \frac{1}{x\left(1 + \sqrt[3]{x}\right)^2} dx$ is equal to

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

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

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

D. none of these

Answer: a

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

$f(x)$ is

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

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

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

D. none of these

Answer: b

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50. Let $f(x)$ be a polynomial satisfying f(0)=2 , $f'(0) = 3$ and $f''(x) = f(x)$ then f(4) equals

A. $\frac{5(e^8 + 1)}{2e^4}$

B. $\frac{5(e^8 - 1)}{2e^4}$

C. $\frac{2e^4}{5(e^8 - 1)}$

D. $\frac{2e^4}{5(e^8 + 1)}$

Answer: b

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51. $\int \frac{dx}{(x+1)(x-2)} = A\log(x+1) + B\log(x-2) + C$, where

A. A+B=0

B. A - B = 0

C. AB =1

D. AB =-1

Answer: A

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52. $\int \frac{x^4+1}{x^6+1}dx$ is equal to

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

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

C. $-\tan^{-1}x - \frac{1}{3}\tan^{-1}x^3 + C$

D. none of these

Answer: a

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

A. $\log_e\left|x+\frac{1}{x}+\sqrt{x^2+\frac{1}{x^2}+3}\right|+C$

B. $\log_e\left|x-\frac{1}{x}+\sqrt{x^2+\frac{1}{x^2}-3}\right|+C$

C. $\log_e\left|x+\sqrt{x^2+3}\right|+C$

D. none of these

Answer: a

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

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

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

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

D. none of these

Answer: b

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55. If $I = \int \frac{\sin 2x}{(3+4\cos x)^3} dx$, then I equals

A. $\frac{3\cos x + 8}{(3+4\cos x)^2} + C$

B. $\frac{3+8\cos x}{16(3+4\cos x)^2} + C$

C. $\frac{3+\cos x}{(3+4\cos x)^2} + C$

D. $\frac{3-8\cos x}{16(3+4\cos x)^2} + C$

Answer: b

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56. $\int \frac{\left(\left\{x+\sqrt{x^2+1}\right\}\right)^n}{\sqrt{x^2+1}} dx$ is equal to

A. $\left\{x+\sqrt{x^2+1}\right\}^n + C$

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

C. $\frac{1}{n+1}\left\{x+\sqrt{x^2+1}\right\}^{n+1}+C$

D. none of these

Answer: b

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

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

B. $\{f(x)\}^3$

C. $\frac{|f(x)|^3}{3}$

D. $\{f(x)\}^2$

Answer: a

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58. Evaluate $\int \frac{\cos x - \sin x}{\cos x + \sin x}(2 + 2\sin 2x)dx$

A. $\sin 2x + C$

B. $\cos 2x + C$

C. $\tan 2x + C$

D. none of these

Answer: a

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59. $\int \frac{dx}{(2x-7)\sqrt{x^2 - 7x + 12}}$ is equal to

A. $2\sec^{-1}(2x - 7) + C$

B. $\sec^{-1}(2x - 7) + C$

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

D. none of these

Answer: b

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60. The value of $\int x \log x(\log x - 1)dx$ is equal to

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

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

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

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

Answer: b

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61. $\int (1 + x - x^{-1})e^{x+x^{-1}}dx =$

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

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

C. $-xe^{x+x^{-1}}+C$

D. $xe^{x+x^{-1}}+C$

Answer: d

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62. If $I_n=\int(\text{In } x)^n dx, \quad \text{then } \quad I_n+nI_{n-1}=$

A. $(x\log x)^n$

B. $x(\log x)^n$

C. $n(\log x)^n$

D. $(\log x)^{n-1}$

Answer: b

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63. The value of $\int \frac{\sin^2 x \cos^2 x}{\left(\sin^3 x + \cos^3 x\right)^2} dx$, is

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

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

C. $\frac{1}{1+\tan^3 x}$

D. $-\frac{1}{1+\tan^3 x}$

Answer: b

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64. The integral $\int \frac{\sec^2 x}{(\sec x + \tan x)^{\frac{9}{2}}} dx$ equals (for some arbitrary constant K). $-\frac{1}{(\sec x + \tan x)^{\frac{11}{2}}}\left\{\frac{1}{11} - \frac{1}{7}(\sec x + \tan x)^2\right\} + K$

$\frac{1}{(\sec x + \tan x)^{\frac{1}{11}}}\left\{\frac{1}{11} - \frac{1}{7}(\sec x + \tan x)^2\right\} + K$

$-\frac{1}{(\sec x + \tan x)^{\frac{11}{2}}}\left\{\frac{1}{11} + \frac{1}{7}(\sec x + \tan x)^2\right\} + K$

$\frac{1}{(\sec x + \tan x)^{\frac{11}{2}}}\left\{\frac{1}{11} + \frac{1}{7}(\sec x + \tan x)^2\right\} + K$

A. $-\frac{1}{(\sec x+\tan x)^{11/2}}\left\{\frac{1}{11}-\frac{1}{7}(\sec x+\tan x)^2\right\}+K$

B. $\frac{1}{(\sec x+\tan x)^{11/2}}\left\{\frac{1}{11}-\frac{1}{7}(\sec x+\tan x)^2\right\}+K$

C. $-\frac{1}{(\sec x+\tan x)^{11/2}}\left\{\frac{1}{11}-\frac{1}{7}(\sec x+\tan x)^2\right\}+K$

D. $\frac{1}{(\sec x+\tan x)^{11/2}}\left\{\frac{1}{11}-\frac{1}{7}(\sec x+\tan x)^2\right\}+K$

Answer: c

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65. If $f(x)=\int\frac{\left(x^2+\sin^2 x\right)}{1+x^2}\sec^2 x\,dx$ and f(0) = 0, then f(1) is :

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

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

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

D. $\tan 1+1$

Answer: c

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66. At present, a firm is manufacturing 2000 items. It is estimated that the rate of change of production P w.r.t. additional number of workers x is given by $\frac{dP}{dx} = 100 - 12\sqrt{x}.$ If the firm employs 25 more workers, then the new level of production of items is (1) 3000 (2) 3500 (3) 4500 (4) 2500

A. 2500

B. 3000

C. 3500

D. 4500

Answer: c

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67. If $\int f(x)dx = \Psi(x), \quad \text{then} \quad \int x^5 f(x)^3 dx$ is equal to

A. $\frac{1}{3}x^3\left\{x^3\phi(x^3) - \int x^2\phi(x^3)dx\right\} + C$

B. $\frac{1}{3}x^3\phi(x^3) - 3\int x^3\phi(x^3)dx + C$

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

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

Answer: c

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68. 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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69. if $\int \frac{1-5\sin^2 x}{\cos^5 x \sin^2 x}dx = \frac{f(x)}{\cos^5 x} + c$ then $f(x)$

A. $-\cot x$

B. $-\text{cosec}\ \ x$

C. $\text{cosec}\ \ x$

D. cot x

Answer: a

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70. $\int \left(x^{7m} + x^{2m} + x^m\right)\left(2x^{6m} + 7x^m + 14\right)^{\frac{1}{m}} dx$

A. $\frac{\left(7x^{7m} + 2x^{2m} + 14x^m\right)^{\frac{m+1}{m}}}{14(m+1)} + C$

B. $\frac{\left(2x^{7m} + 14x^{2m} + 7x^m\right)^{\frac{m+1}{m}}}{14(m+1)} + C$

C. $\frac{\left(2x^{7m} + 7x^{2m} + 14x^m\right)^{\frac{m+1}{m}}}{14(m+1)} + C$

D. $\frac{\left(7x^{7m} + 2x^{2m} + x^m\right)^{\frac{m+1}{m}}}{14(m+1)} + C$

Answer: c

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71. $\int \frac{xdx}{\sqrt{1+x^2+\sqrt{(1+x^2)^3}}}$ is equal to

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

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

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

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

Answer: d

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72. $\int \sqrt{x-3}\left(\sin^{-1}(Inx)+\cos^{-1}(Inx)\right)dx$ is equal to

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

B. 0

C. 1

D. none of these

Answer: a

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

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

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

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

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

Answer: a

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74. $\int e^{x^4}\left(x+x^3+2x^5\right)e^{x^2}dx$ is equal to

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

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

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

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

Answer: d

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75. $\int\left(\sin(101x).\sin^{99}x\right)dx$ equals

A. $\frac{1}{100}\sin(100x)(\sin x)^{100}+C$

B. $\frac{1}{100}\cos(100x)(\sin x)^{100}+C$

C. $\frac{1}{100}\cos(100x)(\cos x)^{100}+C$

D. $\frac{1}{100}\sin(100x)(\sin x)^{101}+C$

Answer: a

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76. Suppose $\int\frac{1-7\cos^2 x}{\sin^7 x\cos^2 x}dx=\frac{g(x)}{\sin^7 x}+c$ where C is arbitrary constant of integration.then find value of $g'(0)+g''\left(\frac{\pi}{4}\right)$

A. sin x

B. cos x

C. tan x

D. cot x

Answer: c

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77. $\int\left(x^2+x\right)\left(x^{-8}+2x^{-9}\right)^{1/10}dx$ is equal to

A. $\frac{5}{11}\left(x^2+2x\right)^{11/10}+C$

B. $\frac{5}{11}(x+1)^{11/10}+C$

C. $\frac{6}{7}(x+1)^{11/10}+C$

D. $\frac{11}{5}\left(x^2+2x\right)^{11/10}+C$

Answer: a

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78. If $\int\frac{2}{(2-x)^2}\left(\frac{2-x}{2+x}\right)^{1/3}dx=\lambda\left(\frac{2+x}{2-x}\right)^{\mu}+c$ where λ and μ are rational number in its simplest form then $\left(\lambda+\frac{1}{\mu}\right)$ is equal to

A. 1

B. 2

C. 3

D. 6

Answer: c

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79. Let f(x) be a quadratic function such that $f(0) = 1$ and $\int \frac{f(x)}{x^2(x+1)^3} dx$ is a rational function, then the value of $f'(0)$ is

A. 0

B. 2

C. 3

D. 5

Answer: c

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80. $\int \frac{xdx}{\sqrt{1+x^2+\sqrt{(1+x^2)^3}}}$ is equal to

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

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

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

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

Answer: d

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81. $\int \frac{e^x(x-1)(x-\ln x)}{x^2}dx$ is equal to

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

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

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

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

Answer: d

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82. $\int x^{27}\left(1+x+x^2\right)^6\left(6x^2+5x+4\right)dx=$

A. $\frac{1}{7}\left(x^6+x^5+x^4\right)^7$

B. $\frac{1}{7}\left(6x^5+5x^4+4x^3\right)^7$

C. $\frac{1}{7}\left(6x^6+5x^5+4x^4\right)^7$

D. $\frac{1}{7}\left(x^5+x^4+x^3\right)^7$

Answer: a

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83. Let f (x) be a quadratic function such that f (0) =1 and $f(-1)=4$, if $\int \frac{f(x)}{x^2(1+x)^2}dx$ is a rational function then the value of f(10)

A. 584

B. 521

C. 520

D. 583

Answer: b

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84. Evaluate

$$\int \frac{e^{\tan^{-1}x}}{(1+x^2)}\left[\left(\sec^{-1}\sqrt{1+x^2}\right)^2+\cos^{-1}\left(\frac{1-x^2}{1+x^2}\right)\right]dx(x>0).$$

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

B. $I=e^{\tan^{-1}x}\left(\sec^{-1}\sqrt{1+x^2}\right)^2+C$

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

D. $I = e^{\tan^{-1} x} \left(\text{cosec}^{-1} \sqrt{1 + x^2}\right)^2 + C$

Answer: b

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85. $\int \frac{x^2 \left(x \sec^2 x + \tan x\right)}{\left(x \tan x + 1\right)^2}$

A. $\frac{-x}{(\tan x + 1)} + 2 \ \text{In}|x \sin x + \cos x| + C$

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

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

D. none of these

Answer: b

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86. $\int \frac{mx^{m+2n-1} - nx^{n-1}}{x^{2m+2n} + 2x^{m+n} + 1} dx$ is equal to

A. $\frac{-x^m}{x^{m+n} + 1} + C$

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

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

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

Answer: c

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87. Evaluate $\int \frac{dx}{\tan x + \cot x + \sec x + \cos ecx}$.

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

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

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

D. none of these

Answer: d

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88. $\int \frac{x^2(1-\ln x)}{\left(\ln^4 x - x^4\right)dx}$ is equal to

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

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

C. $\frac{1}{4}\text{In}\left(\frac{\text{In}\ x + x}{\text{In}\ x - x}\right) + \frac{1}{2}\tan^{-1}\left(\frac{\text{In}\ x}{x}\right) + C$

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

Answer: b

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89. The integral $\int \frac{2x^{12} + 5x^9}{\left(x^5 + x^3 + 1\right)^3}dx$ is equal to

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

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

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

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

Answer: N/A

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90. If $\int \frac{dx}{\cos^3 x\sqrt{\sin 2x}}=a\left(\tan^2 x+b\right)\sqrt{\tan x}+C$, then

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

B. $\frac{27}{5}$

C. $\frac{7}{10}$

D. $\frac{27}{10}$

Answer: a

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91. If $\int \frac{dx}{x^3(1+x^6)^{\frac{2}{3}}} = xf(x)\left(1+x^6\right)^{\frac{1}{3}} + C$ where, C is a constant of integration, then the function f(x) is equal to

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

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

C. $-\frac{6}{x}$

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

Answer: a

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

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

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

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

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

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Section II - Assertion Reason Type

1. Let F(x) be an indefinite integral of $\sin^2 x$

Statement I The function F(x) satisfies $F(x+\pi)=F(x)$ for all real x.

Because

Statement II $\sin^2(x+\pi)=\sin^2 x,$ for all real x.

A. Statement - 1 True , Statement -2 is True , Statement -2 is a correct explanation for Statement -1.

B. Statement - 1 is True , Statement -2 is True , Statement -2 is a correct explanation for Statement -1.

C. Statement - 1 True ,Statement - 2 is False.

D. Statement - 1 is False , Statement - 2 is True.

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2. Statement - 1 : The value of the integral $\int \frac{e^{3x}+e^{x}}{e^{4x}+1}dx$ is $\frac{1}{\sqrt{2}}\tan^{-1}\left(\frac{e^{x}-e^{-x}}{\sqrt{2}}\right)+C$

Statement -2: A primitive of the function f (x) $=\frac{x^{2}+1}{x^{4}+1}$ is $\frac{1}{\sqrt{2}}\tan^{-1}\left(\frac{x^{2}-1}{\sqrt{2}x}\right)$.

A. Statement - 1 True ,

Statement -2 is True , Statement -2 is a correct

explanation for Statement -1.

B. Statement - 1 is True ,

Statement -2 is True , Statement -2 is a correct

.explanation for Statement -1.

C. Statement - 1 True ,Statement - 2 is False.

D. Statement - 1 is False , Statement - 2 is True.

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3. Statement -1 : If $I_1 = \int \frac{e^x}{e^{4x} + e^{2x} + 1} dx$ and $I_2 = \int \frac{e^{-x}}{e^{-4x} + e^{-2x} + 1} dx$, then $I_2 - I_1 = \frac{1}{2} \log \left(\frac{e^{2x} - e^x + 1}{e^{2x} + e^x + 1} \right) + C$

where C is an arbitrary constant.

Statement -2 : A primitive of f(x) $= \frac{x^2 - 1}{x^4 + x^2 + 1}$ is $\frac{1}{2} \log \left(\frac{x^2 - x + 1}{x^2 + x + 1} \right)$.

A. Statement - 1 True ,

Statement -2 is True , Statement -2 is a correct

explanation for Statement -1.

B. Statement - 1 is True ,

Statement -2 is True , Statement -2 is a correct

explanation for Statement -1.

C. Statement - 1 True ,Statement - 2 is False.

D. Statement - 1 is False , Statement - 2 is True.

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Exercise

1. Value of $\int \frac{1}{\sin(x-a)\cos(x-b)}$ dx is equal to

A. $\frac{1}{\sin(a-b)}\log\left|\frac{\sin(x-a)}{\cos(x-b)}\right| + C$

B. $\frac{1}{\cos(a-b)}\log\left|\frac{\sin(x-a)}{\cos(x-b)}\right| + C$

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

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

Answer: B

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

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

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

C. $\log(1+\cos x) + C$

D. $\log(1+\sin x) + C$

Answer: a

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3. Evaluate: $\int \frac{1}{(1+x^2)\sqrt{1-x^2}} dx$

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

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

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

D. none of these

Answer: c

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4. $\int \frac{2^x}{\sqrt{1-4^x}} dx = k \sin^{-1} 2^x + c$, then k =

A. log 2

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

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

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

Answer: d

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

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

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

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

D. none of these

Answer: a

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6. If $\int\frac{1}{x\sqrt{1-x^3}}dx=a\log\left|\frac{\sqrt{1-x^3}-1}{\sqrt{1-x^3}+1}\right|+b, thenaisequal\ \frac{1}{3}$ (b) $\frac{2}{3}$ (c) $-\frac{1}{3}$ (d0 $-\frac{2}{3}$

A. $1/3$

B. $2/3$

C. $-1/3$

D. $-2/3$

Answer: a

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

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

B. $e^x(x+1) + C$

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

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

Answer: a

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8. $\int e^{x \log a} . e^x dx$ is equal to

A. $(ae)^x$

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

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

D. none of these

Answer: B

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9. If $\int g(x)dx = g(x)$, then evaluate $\int g(x)\{f(x)+f'(x)\}dx$

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

B. $g(x)f'(x) + C$

C. $g(x)f(x) + C$

D. $g(x)f^2(x) + C$

Answer: c

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10. If $\int \frac{1}{(\sin x+4)(\sin x-1)}dx$
$= A\frac{1}{\tan\frac{x}{2}-1} + B\tan^{-1}\{f(x)\} + C$. Then,

A. $A = \frac{1}{5}, B = \frac{-2}{5\sqrt{15}}, f(x) = \frac{4\tan x+3}{\sqrt{15}}$

B. $A = -\frac{1}{5}, B = \frac{1}{\sqrt{15}}, f(x) = \frac{4\tan(x/2)+1}{\sqrt{15}}$

C. $A = \frac{2}{5}, B = \frac{-2}{5}, f(x) = \frac{4\tan x+1}{5}$

D. $A = \frac{2}{5}, B = \frac{-2}{5\sqrt{15}}, f(x) = \frac{4\tan x/2+1}{\sqrt{15}}$

Answer: d

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11. $\int \cos^3 x e^{\log(\sin x)}dx$ is equal to

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

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

C. $\frac{e^{\sin x}}{4} + C$

D. none of these

Answer: B

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12. Evaluate: $\int\{1+2\tan x(\tan x+\sec x)\}^{\frac{1}{2}}dx$

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

B. $\log\operatorname{cosec}(\sec x+\tan x)+C$

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

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

Answer: c

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13. Integration ∫(m) ^ m .dx

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14. Find : $\int\left(\sqrt{x^2+1}\frac{\log\left(x^2+1\right)-2\log x}{x^4}dx\right.$

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

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

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

D. none of these

Answer: b

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15. $\int\frac{\sqrt{\tan x}}{\sin x\cos x}dx$ is equal to.

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

B. $2\sqrt{\cot x}+C$

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

D. none of these

Answer: A

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

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

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

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

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

Answer: a

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

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

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

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

D. none of these

Answer: b

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18. $\int 5^{5^{5^x}}.5^{5^{5x}}.5^x$ dx is equal to :

A. $\frac{5^{5^x}}{(\log 5)^3}+C$

B. $5^{5^{5^x}}(\log 5)^3+C$

C. $\frac{5^{5^{5^x}}}{(\log 5)^3}+C$

D. none of these

Answer: C

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19. if $\int \frac{1}{1+\sin x} dx = \tan\left(\frac{x}{2}+a\right)+C$ then find the value of a

A. $a = -\frac{\pi}{4}, b \in R$

B. $a = \frac{\pi}{4}, b \in R$

C. $a = \frac{5\pi}{4}, b \in R$

D. none of these

Answer: a

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20. If $\left[f(x)g''(x) - f''g(x)\right]dx$ 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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21. The relation

$\int(\sin 2x + \cos 2x) = \frac{1}{\sqrt{2}}\sin(2x - a) + c$ is true for

A. $a = \frac{5\pi}{4}, b \in R$

B. $a = -\frac{5\pi}{4}, b \in R$

C. $a = \frac{\pi}{4}, b \in R$

D. none of these

Answer: b

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

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

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

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

D. none of these

Answer: c

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23. The value of $\int_0^{\pi/2} \frac{\cos 2x}{(\sin x + \cos x)^2} dx$ is equal to

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

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

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

D. $\log(\sin x + \cos x)^2 + C$

Answer: b

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24. $\int \frac{4e^x + 6e^{-x}}{9e^x - 4e^{-x}} dx = Ax + B\log\left(9e^{2x} - 4\right) + C, then$ A=_____ _, B=_____, C=_____

A. $A = -\frac{3}{2}, B = \frac{35}{36}, C = 0$

B. $A = \frac{35}{36}, B = -\frac{3}{2}, C \in R$

C. $A = -\frac{3}{2}, B = \frac{35}{36}, C \in R$

D. none of these

Answer: c

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25. If $\int f(x)\sin x\cos x dx = \frac{1}{2(b^2-a^2)}\ln f(x) + c$,then f(x) is equal to

A. $\frac{1}{a^2\sin^2 x + b^2\cos^2 x}$

B. $\frac{1}{a^2\sin^2 x - b^2\cos^2 x}$

C. $\frac{1}{a^2\cos^2 x + b^2\sin^2 x}$

D. $\frac{1}{a^2\cos^2 x - b^2\sin^2 x}$

Answer: a

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26. $\int \frac{x+2}{(x^2+3x+3)\sqrt{x+1}}dx$ is equal to $\frac{1}{3}\tan^{-1}\left(\frac{x}{\sqrt{3(x+1)}}\right)$ (b) $\frac{2}{\sqrt{3}}\tan^{-1}\left(\frac{x}{\sqrt{3(x+1)}}\right)$ $\frac{2}{\sqrt{3}}\tan^{-1}\left(\frac{x}{\sqrt{x+1}}\right)$ (d) none of these

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

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

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

D. none of these

Answer: b

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27. $\int \frac{\left(x+x^3\right)^{1/3}}{x^4} dx =$

A. $\frac{3}{8}\left(\frac{1}{x^2}-1\right)^{4/3}+C$

B. $-\frac{3}{8}\left(\frac{1}{x^2}-1\right)^{4/3}+C$

C. $\frac{1}{8}\left(1-\frac{1}{x^2}\right)^{4/3}+1$

D. none of these

Answer: B

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28. $\int \frac{(x4-x)^{1/4}}{x^5} dx$ 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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29. Integrate the functions $f'(ax+b)[f(ax+b)]^n$

A. $\frac{1}{n+1}\{f(ax+b)\}^{n+1}+C$, for all n except n =-1

B. $\frac{1}{n+1}\{f(ax+b)\}^{n+1}+C$, for all n

C. $\frac{1}{a(n+1)}\{f(ax+b)\}^{n+1}+C$ for all n except n =- 1

D. $\frac{1}{a(n+1)}\{f(ax+b)\}^{n+1}+C$, for all n

Answer: c

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30. $\int \frac{dx}{\sqrt{\sin^3 x \cos x}} = ?$

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

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

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

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

Answer: a

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31. The value of the integral $\int \frac{1+x^2}{1+x^4} dx$ is equal to

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

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

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

D. none of these

Answer: b

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32. If $l^r(x)$ means log log log ... x, the log being repeated r times, then $\int [xl(x)l^2(x)l^3(x)...l^r(x)]^{-1}dx$ is equal to

A. $l^{r+1}(x) + C$

B. $\frac{l^{r+1}(x)}{r+1} + C$

C. $l^r(x) + C$

D. none of these

Answer: a

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33. $\int x^{-2/3}\left(1+x^{1/2}\right)^{-5/3}$ 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 these

Answer: b

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

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

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

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

D. none of these

Answer: b

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35. $\int \frac{\cos x + x \sin x}{x^2 + x \cos x} dx = \ldots.$

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

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

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

D. none of these

Answer: b

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36. The value of $\int \frac{\cos 2x}{\cos x}$ dx is equal to

A. $2 \sin x + \log(\sec x + \tan x) + C$

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

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

D. none of these

Answer: C

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

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

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

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

D. none of these

Answer: a

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38. $\int \frac{a\sqrt{x}}{\sqrt{x}} dx$ equals

A. $\frac{a^{\sqrt{x}}}{\log a} + C$

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

C. $2a^{\sqrt{x}}.\log a + C$

D. none of these

Answer: B

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39. If $\int \frac{dx}{5 + 4\cos x} = P\tan^{-1}\left(m\frac{\tan x}{2}\right) + C$ then,

A. $A = 1, B = 3$

B. $A = 2/3, B = 3$

C. $A = -1, B = 1/3$

D. $A = 1/3, B = 2/3$

Answer: B

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40. If $I = \int \frac{dx}{x^4\sqrt{a^2+x^2}}$, then I equals

A. $\frac{1}{a^4}\left\{\frac{1}{x}\sqrt{a^2+x^2} - \frac{1}{3x^3}\sqrt{a^2+x^2}\right\} + C$

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

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

D. none of these

Answer: b

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41. $\int \frac{\log(x+1) - \log x}{x(x-1)}dx$ is equal to :

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

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

C. $\frac{1}{2}[\log(1+1/x)]^2+C$

D. none of these

Answer: b

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42. Let $x^2 \neq \pi-1, n \in N$, then

$\int x\sqrt{\frac{2\sin(x^2+1)-\sin 2(x^2+1)}{2\sin(x^2+1)+\sin 2(x^2+1)}}dx$ is equal to

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

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

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

D. none of these

Answer: b

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43. Given, $f(x) = \begin{vmatrix} 0 & x^2 - \sin x & \cos x - 2 \\ \sin x - x^2 & 0 & 1 - 2x \\ 2 - \cos x & 2x - 1 & 0 \end{vmatrix}$, then $\int f(x)dx$ is equal to

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

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

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

D. none of these

Answer: d

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44. $\int \frac{dx}{x^{1/2}(1+x^2)^{5/4}}$ is equal to :

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

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

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

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

Answer: b

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45. $\int \frac{x^2}{(a+bx^2)^{5/2}}dx$ is equal to

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

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

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

D. none of these

Answer: b

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46. $\int \frac{\sin^3 x}{(1+\cos^2 x)\sqrt{1+\cos^2 x+\cos^4 x}}dx$ is equal to

A. $\sec^{-1}(\sec x+\cos x)+C$

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

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

D. none of these

Answer: a

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47. $\int \frac{1}{\sqrt{\sin^3 x \sin(x+\alpha)}}dx$ is equal to

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

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

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

D. none of these

Answer: b

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48. The antiderivative of $\frac{3^x}{\sqrt{1-9^x}}$ with respect to x is

A. $(\log_3 e)\sin^{-1}(3^x)+C$

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

C. $(\log_3 e)\cos^{-1}(3^x)$

D. none of these

Answer: a

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49. Integration of $\frac{1}{\sqrt{x^2+9}}$ with respect to $\left(x^2+1\right)$ is equal to

A. $\sqrt{x^2+9}+C$

B. $-\frac{1}{\sqrt{x^2+9}}+C$

C. $2\sqrt{x^2+9}+C$

D. none of these

Answer: c

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50. If $\int \frac{\sin\theta-\cos\theta}{(\sin\theta+\cos\theta)\sqrt{\sin\theta\cos\theta+\sin^2\theta\cos^2\theta}}d\theta=\text{cosec}^{-1}(f(\theta))+C$,

then

A. $f(\theta)=\sin 2\theta+1$

B. $f(\theta)=1-\sin 2\theta$

C. $f(\theta)=\sin 2\theta-1$

D. none of these

Answer: a

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51. The primitive of the function f (x) $= (2x+1)|\cos x|$, when $\frac{\pi}{2} < x < \pi$ is given by

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

B. $-\cos x - x \sin x$

C. $x \sin x - \cos x$

D. none of these

Answer: b

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52. The primitive of the function $f(x) = (2x+1)|\sin x|$, when $\pi < x < 2\pi$ is

A. $-(2x+1)\cos x + 2\sin x + C$

B. $(2x+1)\cos x - 2\sin x + C$

C. $\left(x^2+x\right)\cos x + C$

D. none of these

Answer: D

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53. $IfI = \int\sqrt{\frac{5-x}{2+x}}dx, thenIequal$

$\sqrt{x+2}\sqrt{5+x} + 3\sin^{-1}\sqrt{\frac{x+2}{3}} + C$

$\sqrt{x+2}\sqrt{5-x} + 7\sin^{-1}\sqrt{\frac{x+2}{7}} + C$

$\sqrt{x+2}\sqrt{5-x} + 5\sin^{-1}\sqrt{\frac{x+2}{5}} + C$ none of these

A. $\sqrt{x+2}\sqrt{5-x} + 3\sin^{-1}\sqrt{\frac{x+2}{3}} + C$

B. $\sqrt{x+2}\sqrt{5-x} + 7\sin^{-1}\sqrt{\frac{x+2}{7}} + C$

C. $\sqrt{x+2}\sqrt{5-x} + 5\sin^{-1}\sqrt{\frac{x+2}{5}} + C$

D. none of these

Answer: b

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54. The value of the integral $\int \frac{x \sin x^2 e^{\sec x^2}}{\cos^2 x^2} dx$, is

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

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

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

D. none of these

Answer: a

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55. Evaluate: $\int \frac{x^2 - 1}{x\sqrt{(x^2 + \alpha x + 1)(x^2 + \beta x + 1)}} dx$

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

B. $2\log\left\{\frac{\sqrt{x^2+\alpha x+1}-\sqrt{x^2+\beta x+1}}{\sqrt{x}}\right\}+C$

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

D. none of these

Answer: a

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56. Evaluate $\int\frac{e^{2x}-2e^x}{e^{2x}+1}dx$

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

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

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

D. none of these

Answer: c

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

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

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

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

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

Answer: a

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58. $\int \frac{a^{x/2}}{\sqrt{a^{-2} - a^x}} dx$ is equal to

A. $\frac{1}{\log a} \sin^{-1}(a^x)$

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

C. $2\sqrt{a^{-x} - a^x}$

D. $\log(a^x - 1)$

Answer: a

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59. $\int \frac{f(x)}{f(x)\log(f(x))}dx$ is equal to

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

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

C. $\log\{\log f(x)\} + C$

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

Answer: c

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60. Evaluate: $\int \frac{e^x}{(1+e^x)(2+e^x)}\,dx$

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

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

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

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

Answer: A

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

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

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

C. $\sqrt{1+x}+C$

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

Answer: b

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Chapter Test

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

A. a. $-16\frac{2x+1}{(2x+1)^2+3}-\frac{16}{3\sqrt{3}}\tan^{-1}\left(\frac{2x+1}{\sqrt{3}}\right)+C$

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

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

D. d. $\frac{1}{4(x^2+x+1)}+\frac{2}{3}\tan^{-1}(2x+1)+C$

Answer: a

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2. If $\int \frac{x\tan^{-1}x}{\sqrt{1+x^2}}dx=\sqrt{1+x^2}f(x)+A\ \ln\ \sqrt{x^2+1}\ |\ +C$, then

A. $f(x)=\tan^{-1}x, A=-1$

B. $f(x)=\tan^{-1}x, A=1$

C. $f(x)=2\tan^{-1}x, A=-1$

D. $f(x) = 2\tan^{-1} x, A = 1$

Answer: c

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3. If $\int x \log(1 + 1/x)dx = f(x)\log(x + 1) + g(x)x^2 + Ax + C,$ then

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

B. $g(x) = \log x$

C. $A = 1$

D. none of these

Answer: d

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4. If $\int \frac{xe^x}{\sqrt{1 + e^x}}dx = f(x)\sqrt{1 + e^x} - 2\log g(x) + C,$ then

A. $f(x) = x - 1$

B. $g(x) = \dfrac{\sqrt{1+e^x} - 1}{\sqrt{1+e^x} - 1}$

C. $g(x) = \dfrac{\sqrt{1+e^x} + 1}{\sqrt{1+e^x} - 1}$

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

Answer: d

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5. The value of $\int \dfrac{\cos^3 x + \cos^5}{\sin^2 x + \sin^4 x} dx$

A. $\sin x - 6\tan^{-1}(\sin x) + C$

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

C. $\sin x - 2(\sin x)^{-1} 6\tan^{-1}(\sin x) + C$

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

Answer: c

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6. If $\int \frac{dx}{(x^2+1)(x^2+4)} = k\tan^{-1}x + l\tan^{-1}.\frac{x}{2} + C$, then

A. $A = 1/3, B = -2/3$

B. $A = -1/3, B = 2/3$

C. $A = -1/3, B = 1/3$

D. $A = 1/3, B = -1/6$

Answer: a

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7. If $\int \log\left(\sqrt{1-x} + \sqrt{1+x}\right)dx = xf(x) + Ax + B\sin^{-1}x + C$, then

A. $f(x) = \log\left(\sqrt{1-x} + \sqrt{1+x}\right)$

B. $A = 1/3$

C. $B = 2/3$

D. $B = -1/2$

Answer: a

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8. If $\int \frac{x^5}{\sqrt{1+x^3}} dx$ is equal to

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

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

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

D. $x^2 \log\left(1+x^3\right) + C$

Answer: b

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9. The value of :

$\int e^{\sec x}.\sec^3 x\left(\sin^2 x+\cos x+\sin x+\sin x\cos x\right)dx$ is :

A. $\int e^{\sec x}.\left(\sec^2 x+\sec x\tan x\right)$

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

C. $e^{\sec x}(\sec x+\tan x)+C$

D. none of these

Answer: c

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10. If $\int\frac{2x^2+3}{(x^2-1)(x^2+4)}dx=a\ln\left(\frac{x-1}{x+1}\right)+b\tan^{-1}.\frac{x}{2}+c,$ then values of a and b are respectively.

A. $(-1/2, 1/2)$

B. $(1/2, 1/2)$

C. $(-1, 1)$

D. $(1, -1)$

Answer: a

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11. Let $f(x) = \dfrac{x}{(1+x^n)^{1/n}}$ for $n \geq 2$ and $g(x) = \underbrace{fofo...of}_{\text{n times}}(x)$, then $\int x^{n-2} g(x) dx$ equals to

A. $\dfrac{1}{n(n-1)}(1+nx^n)^{1-\frac{1}{n}} + k$

B. $\dfrac{1}{n-1}(1+nx^n)^{1-\frac{1}{n}} + k$

C. $\dfrac{1}{n(n-1)}(1+nx^n)^{1+\frac{1}{n}} + k$

D. $\dfrac{1}{n-1}(1+nx^n)^{1+\frac{1}{n}} + k$

Answer: a

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12. The value of $\int \frac{(ax^2 - b)dx}{x\sqrt{c^2x^2 - (ax^2 + b)^2}}$ is equal to

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

B. $\sin^{-1}\left(\frac{ax^2 + \frac{b}{x^2}}{c}\right) + k$

C. $\cos^{-1}\left(\frac{ax + b/x}{c}\right) + k$

D. $\cos^{-1}\left(\frac{ax^2 + \frac{b}{x^2}}{c}\right) + k$

Answer: a

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13. Evalaute: $\int e^x \frac{1 + nx^{n-1} - x^{2n}}{(1 - x^n)\sqrt{1 - x^{2n}}}$dx

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

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

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

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

Answer: d

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

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

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

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

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

Answer: a

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

A. $\frac{20}{3}\left(1+x^2\right)^{2/3}\left(2x^2-3\right)+C$

B. $\frac{3}{20}\left(1+x^2\right)^{2/3}\left(2x^2-3\right)+C$

C. $\frac{3}{20}\left(1+x^2\right)^{2/3}\left(2x^2+3\right)+C$

D. none of these

Answer: b

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16. $\int \frac{\sin x}{\sin(x-\alpha)}dx = Ax + B\log(\sin(x-\alpha)) + C$ then find out (A, B)

A. $A = \sin\alpha, B = \cos\alpha$

B. $A = \cos\alpha, B = -\sin\alpha$

C. $A = \cos\alpha, B = \sin\alpha$

D. none of these

Answer: c

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

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18. Evaluate: $\int \frac{x-1}{(x+1)\sqrt{x^3+x^2+x}}dx$

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

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

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

D. none of these

Answer: b

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

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

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

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

D. none of these

Answer: b

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20. $\int \frac{1+x^4}{(1-x^4)^{3/2}}dx$ 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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21. If $\int\frac{dx}{x^4+x^3}=\frac{A}{x^2}+\frac{B}{x}+\ln\left|\frac{x}{x+1}\right|+C$, then

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

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

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

D. none of these

Answer: c

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22. If $f'(x)=\frac{1}{(1+x^2)^{3/2}}$ and $f(0)=0$, then $f(1)$ is equal to :

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

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

C. $\sqrt{2}$

D. none of these

Answer: b

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23. $\int (x)^{\frac{1}{3}} \left(\sqrt[7]{1+\sqrt[3]{x^4}}\right) dx$ is equal to

A. $\frac{21}{32}\left\{1+\sqrt[3]{x^4}\right\}^{8/7}+C$

B. $\frac{32}{21}\left\{1+\sqrt[3]{x^4}\right\}^{8/7}+C$

C. $\frac{7}{32}\left\{1+\sqrt[3]{x^4}\right\}^{8/7}+C$

D. none of these

Answer: a

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

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

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

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

D. none of these

Answer: a

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25. $\int \frac{1}{x(x^4-1)} dx$ is equal to

A. $\frac{1}{4}\log\left|\frac{x^4}{x^4-1}\right| + C$

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

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

D. $\log\left|\frac{x^4}{x^4-1}\right|+C$

Answer: B

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26. $\int\frac{1+x}{1+3\sqrt{x}}dx$ is equal to

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

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

C. $\frac{3}{5}x^{5/3}-\frac{3}{4}x^{4/3}+C$

D. none of these

Answer: a

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

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

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

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

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

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

Answer: d

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

A. $\frac{4}{3}\left[1+x^{3/4}+\log_e\left(1+x^{3/4}\right)\right]+C$

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

C. $\frac{4}{3}\left[1+x^{3/4}+\log_e\left(1+x^{3/4}\right)\right]+C$

D. none of these

Answer: b

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30. $\int \frac{x + 3\sqrt{x^2} + 6\sqrt{x}}{x\left(1 + 3\sqrt{x}\right)} dx$

A. $\frac{3}{2}x^{2/3} + 6\tan^{-1} x^{1/6} + C$

B. $\frac{3}{2}x^{2/3} - 6\tan^{-1} x^{1/6} + C$

C. $-\frac{3}{2}x^{2/3} - 6\tan^{-1} x^{1/6} + C$

D. none of these

Answer: a

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