MATHS

BOOKS - DEEPTI MATHS (TELUGU ENGLISH)

INDEFINITE INTEGRATION

SOLVED EXAMPLES

1. $\int \dfrac{(\sin x + \cos x)^2}{1 + \sin 2x} dx =$

A. $x + c$

B. $\sin x + \cos x + c$

C. $\sin x - \cos x + c$

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

Answer: A

2. $\int \dfrac{\sin^3 x}{\sin^2 x \cos^2 x} dx =$

A. $2\sec x + c$

B. $\sec x + c$

C. $\csc x + c$

D. $2\csc x + c$

Answer: B

3. $\int \dfrac{\sin 2x}{1 + \cos^4 x} dx =$

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

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

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

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

Answer: B

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

A. $\sqrt{x^2 - 2x + 3} + 4\sinh^{-1}\left(\dfrac{x - 1}{\sqrt{2}}\right) + c$

B. $\sqrt{x^2 - 2x + 3} + 4\sinh^{-1}\left(\dfrac{x + 1}{\sqrt{2}}\right) + c$

C. $\sqrt{x^2 - 2x - 3} + 4\sinh^{-1}\left(\dfrac{x - 1}{\sqrt{2}}\right) + c$

D. $\sqrt{x^2 - 2x + 3} + 4\sinh^{-1}\left(\dfrac{x - 1}{\sqrt{2}}\right) + c$

Answer: A

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5. $\int \dfrac{x+1}{\sqrt{2x+1}} dx =$

A. $\dfrac{1}{3}(x+2)\sqrt{2x+1} + c$

B. $\dfrac{1}{3}(x-2)\sqrt{2x-1} + c$

C. $(x+2)\sqrt{2x+1} + c$

D. $\dfrac{1}{2}(x+2)\sqrt{2x+1} - c$

Answer: A

6. Evaluate the integerals.

$\int \dfrac{x^2+1}{x^4+1} dx$ on R.`

A. $\dfrac{1}{\sqrt{2}}\tan^{-1}\dfrac{x^2-1}{2x} + c$

B. $\dfrac{1}{\sqrt{2}}\tan^{-1}\dfrac{x^2+1}{2x}+c$

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

D. $\dfrac{1}{\sqrt{2}}\tan^{-1}\dfrac{x-1}{2x}+c$

Answer: A

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7. $\int \dfrac{1}{4+5\cos x}\,dx =$

A. $\dfrac{1}{3}\log\left|\dfrac{3+\tan x/2}{3-\tan x/2}\right|+c$

B. $\dfrac{1}{6}\log\left|\dfrac{3+\tan x/2}{3-\tan x/2}\right|+c$

C. $\dfrac{1}{6}\log\left|\dfrac{3+\tan x/2}{3-\tan x/2}\right|+c$

D. none

Answer: A

8. $\int \dfrac{3\cos x + 2\sin x}{4\cos x + 3\sin x} dx =$

A. $\dfrac{1}{25}\log|4\cos x + 3\sin x| + \dfrac{18}{25}x + c$

B. $\dfrac{1}{25}\log|4\cos x + 3\sin x| - \dfrac{18}{25}x + c$

C. $\dfrac{1}{25}\log|4\cos x - 3\sin x| + \dfrac{18}{25}x + c$

D. none

Answer: A

9. $\int \cos^{-1}\left(4x^3 - 3x\right)dx =$

A. $x\cos^{-1}x - \sqrt{1 - x^2} + c$

B. $x\cos^{-1}x - 3\sqrt{1 - x^2} + c$

C. $3x\cos^{-1}x - \sqrt{1 - x^2} + c$

D. $3x\cos^{-1}x - 3\sqrt{1 - x^2} + c$

Answer: D

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10. $\int \dfrac{\cos^8 x - \sin^8 x}{1 - 2\cos^2\sin^2 x} dx =$

A. $\dfrac{1}{2}\sin 2x$

B. $-\dfrac{1}{2}\sin 2x$

C. `(1)/(2)sin 3x

D. $-\sin^2 x$

Answer: A

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11. If $\int \dfrac{dx}{(2\sin x + \sec x)^4} = At^5 + Bt^6 + Ct^7 + k$, wher $t = (1 + \tan x)^{-1}$, then

$A + B + C =$

A. $\dfrac{-86}{105}$

B. $\dfrac{-01}{105}$

C. $\dfrac{-16}{105}$

D. $\dfrac{-26}{105}$

Answer: C

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12. $\int \dfrac{x^4 - 1}{x^2\sqrt{x^4 + x^2 + 1}} dx =$

A. $\ln \left| \dfrac{\sqrt{x^4 + x^2 + 1}}{x} \right| + c$

B. $\dfrac{\sqrt{x^4 + x^2 + 1}}{x} + c$

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

D. $\dfrac{1}{\sqrt{x^4 + x^2 + 1}} + c$

Answer: B

13. $\displaystyle\int \left(1 + \tan^2 x + \tan^4 x + \tan^6 x\right)dx =$

A. $\tan^2 x + \dfrac{\tan^5 x}{5} + c$

B. $\tan x + \dfrac{\tan^5 x}{5} + c$

C. $x + \dfrac{\tan^3 x}{3} + \dfrac{\tan^5 x}{5} + \dfrac{\tan^7 x}{7} + c$

D. $\tan x + \dfrac{\tan^3 x}{3} + \dfrac{\tan^5 x}{5} + \dfrac{\tan^7 x}{7} + c$

Answer: B

14. If $\int \dfrac{e^x - e^{-x}}{e^{2x} + e^{-2x}} dx = A\ln\left|\dfrac{e^x + e^{-x} + B}{e^x + e^{-x} - B}\right| + c$ then AB=

A. 2

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

C. -2

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

Answer: D

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15. $\int \dfrac{(x - 1)dx}{(x + 1)\sqrt{x^3 + x^2 + x}} =$

A. $2\tan^{-1}\sqrt{x^3 + x^2} + c$

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

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

D. $2\tan^{-1}\sqrt{x^2 + x + \dfrac{1}{x} + 1} + c$

16. $\displaystyle\int \dfrac{2x^{12} + 5x^9}{\left(x^5 + x^3 + 1\right)^3}\,dx = \dfrac{x^p}{q\left(x^5 + x^3 + 1\right)^r} + c$, then $p - q - r=$

A. 6

B. 8

C. 10

D. 14

17. $\int \left(\dfrac{\sin 12x - \sin 9x}{2\cos 7x - 1} \right) dx =$

A. $\dfrac{\cos 2x}{2} - \dfrac{\cos 5x}{5} + c$

B. $\dfrac{\cos 12x}{12} - \dfrac{\cos 9x}{9} + c$

C. $\dfrac{\cos 5x}{5} - \dfrac{\cos 2x}{2} + c$

D. $\dfrac{\cos 9x}{9} - \dfrac{\cos 12x}{2} + c$

Answer: A

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18. If $\int \dfrac{(1 - \cos x)^{2/7}}{(1 + \cos x)^{9/7}} dx = A \left(\tan \dfrac{x}{2} \right)^K + c$, then $AK =$

A. $\dfrac{11}{7}$

B. $\dfrac{121}{49}$

C. $\dfrac{49}{121}$

D. 1

Answer: D

19. If $y(x - y)^2 = x$ then $\int \dfrac{dx}{x - 3y} =$

A. $\ln\left|(x - y)^2 - 1\right| + c$

B. $\dfrac{1}{2}\ln\left|(x - 3y)^2 - 1\right|$

C. $\dfrac{1}{2}\ln\left|(x - y)^2 - 1\right|$

D. $\ln\left|(x - 3y)^2 - 1\right| + c$

Answer: C

20. If $\int \dfrac{(x\cos\alpha + 1)dx}{\left(x^2 + 2x\cos\alpha + 1\right)^{3/2}} = \dfrac{f(x)}{\sqrt{x^2 + 2x\cos\alpha + 1}} + c$ then f(x)=

A. x

B. x^2

C. $2x$

D. $2x^2$

Answer: A

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21. If $\int \dfrac{1 - (\cot x)^{2012}}{\tan x + (\cot x)^{2013}} dx = \dfrac{1}{k}\ln\left|(f(x))^k + (g(x))^k\right| + c,$ then `k

A. 2011

B. 2012

C. 2013

D. 2014

Answer: D

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EXERCISE 1A

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1. $\int \dfrac{1 - \sqrt{x}}{1 + (x)^{\frac{1}{4}}} dx =$

A. $x - \dfrac{4}{5}x^{5/4} + c$

B. $x + \dfrac{4}{5}x^{5/4} + c$

C. $x - \dfrac{2}{5}x^{5/4} + c$

D. $x - \dfrac{3}{5}x^{5/4} + c$

Answer: A

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2. $\int \dfrac{1 - x^4}{1 - x} dx =$

A. $x - \dfrac{x^2}{2} - \dfrac{x^3}{3} - \dfrac{x^4}{4} + c$

B. $x + \dfrac{x^2}{2} + \dfrac{x^3}{3} + \dfrac{x^4}{4} + c$

C. $2x + \dfrac{x^2}{2} + \dfrac{x^3}{3} + \dfrac{x^4}{4} + c$

D. $x^2 + \dfrac{x^2}{2} + \dfrac{x^3}{3} + \dfrac{x^5}{4} + c$

Answer: B

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3. $\int e^{3\log x} dx =$

A. $\dfrac{x^3}{3} + c$

B. $\dfrac{x^3}{3} + c$

C. $\dfrac{x^4}{4} + c$

D. $\dfrac{x^4}{3} + c$

Answer: C

4. Evaluate the integerals.

$$\int e^{\log\left(1 + \tan^2 x\right)} dx \text{ on } I \subset R\backslash\left\{\dfrac{(2n + 1)\pi}{2} : n \in Z\right\}.$$

A. $\sin x + c$

B. $\cos x + c$

C. $\cot x + c$

D. $\tan x + c$

Answer: D

5. $\int \left(\dfrac{e^{5\log x} - e^{4\log x}}{e^{3\log x} - e^{2\log x}} \right) dx =$

A. $x + c$

B. $3x^2 + c$

C. $\dfrac{x^3}{3} + c$

D. $\dfrac{x^2}{2} + c$

Answer: C

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6. $\int \left[1 + x + \dfrac{x^2}{2!} + \dfrac{x^3}{3!} + \dots \right] dx =$

A. $e^x + c$

B. $x + c$

C. $2e^x + c$

D. $2e^{2x} + c$

7. $\int \left(\sum_{r=o}^{\infty} \dfrac{x^r 2^r}{r!} \right) dx =$

A. $e^x + c$

B. $\dfrac{e^{2x}}{2} + c$

C. $\dfrac{-2}{1 - 2x} c$

D. $2e^{2x} + c$

8. $\int \cot^2 x \, dx =$

    A. $-\cot x - x + c$

    B. $\tan x - x + c$

    C. $\cot x - x + c$

    D. $\sin x - x + c$

Answer: A

9. $\int \sin^2 x \sec^2 x \, dx =$

    A. $-\cot x - x + c$

    B. $\tan x - x + c$

C. cot$x$ - x + c

D. sin$x$ - x + c

Answer: B

10. $\int \tanh^2 x\, dx =$

A. x - tanhx + c

B. x - coshx + c

C. x + tanhx + c

D. x + cothx - c

Answer: A

11. $\int (\tan x - \cot x)^2 dx =$

A. $\tan x + x + c$

B. $\tan x - x + c$

C. $\tan x - \cot x + c$

D. $\tan x - \cot x - 4x + c$

Answer: D

12. $\int \dfrac{\cos^2 x}{1 - \sin x} dx =$

A. $x - \cos x + c$

B. $x + \cos x + c$

C. $2x - \cos x + c$

D. $x + \sin x + c$

Answer: A

13. $\int \dfrac{\sin^2 x}{1 + \cos x} dx =$

A. $x + \sin x + c$

B. $x - \sin x + c$

C. $-x + \sin x + c$

D. $2x - \sin x + c$

Answer: B

14. $\int \dfrac{1}{1 + \cos x} dx =$

A. cot$x$ - cosec$x$ + c

B. - cot$x$ + cosec$x$ + c

C. - cot$x$ - cosec$x$ + c

D. cot$x$ - sec$x$ + c

Answer: B

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15. $\int \sec^2 \cosec^2 x \, dx =$

A. tan$x$ + x + c

B. tan$x$ - x + c

C. tan$x$ - cot$x$ + c

D. tan$x$ - cot$x$ - 4x + c

Answer: C

16. $\int \dfrac{1}{1 + \cos 2x} dx =$

A. $\dfrac{1}{2}\tan x + c$

B. $-\dfrac{1}{2}\tan x + c$

C. $2\tan x + c$

D. $-2\tan x + c$

Answer: A

17. $\int \dfrac{1 + \sin^2 x}{1 + \cos 2x} dx =$

A. $2\tan x - \dfrac{1}{2}x + c$

B. $\tan x - \dfrac{1}{2}x + c$

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

D. $2\tan x - \dfrac{1}{2}x + c$

Answer: B

18. $\displaystyle\int \dfrac{a + b\sin x}{\cos^2 x}\,dx =$

A. $a\tan x + b\sec + c$

B. $a\tan x - b\sec x + c$

C. $a\tan x + b\cot x + c$

D. $a\sin x + b\sec x + c$

Answer: A

19. $\int \dfrac{2 - 3\cos x}{\sin^2 x} dx =$

A. $2\cot x - 3\text{cosec}x + c$

B. $-2\cot x + 3\text{cosec}x + c$

C. $-2\cot x + \text{cosec}x + c$

D. $\cot x + 5\text{cosec}x + c$

Answer: B

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20. $\int \sqrt{1 - \sin 2x} dx =$

A. $\sin x - \cos x + c$

B. $\sin x + \cos x + c$

C. $2\sin - \cos x + c$

D. $\sin x - 2\cos x + c$

Answer: B

21. If $x \in (-\pi/2, \pi/2)$ then $\int \sqrt{1 + \cos2x}\,dx =$

A. $2\sqrt{2}\sin x + c$

B. $\sqrt{3}\sin x + c$

C. $\sqrt{2}\sin x + c$

D. $3\sqrt{2}\sin x + c$

Answer: C

22. $\int \dfrac{\sin x + \cos x}{\sqrt{1 + \sin2x}}\,dx =$

A. $-x + c$

B. $x + c$

C. $\cos x + \sin x + c$

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

Answer: B

23. $\int \dfrac{\sin^3 x + \cos^3 x}{\sin^2 x \cos^2 x}\, dx =$

A. $\sin x + \cos x + c$

B. $\tan x + \cot x + c$

C. $\sec x - \operatorname{cosec} x + c$

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

Answer: C

24. $\int \dfrac{3\cos^2x + 4\sin^2x}{\cos^2x\sin^2x} dx =$

A. $-3\cot x + 2\tan x + c$

B. $3\cot x + 4\tan x + c$

C. $-3\cot x + 4\tan x + c$

D. $-3\cot x - 4\tan x + c$

Answer: C

25. $\int \dfrac{a\cos^3x + b\sin^3x}{\cos^2x\sin^2x} dx =$

A. $a\cosec x + b\sec x + c$

B. $-a\cosec x + b\sec x + c$

C. $-a\cos ecx - b\sec x + c$

D. $a - \cos ecx + a\sec x + c$

Answer: B

26. If $\int \dfrac{\sin^8 x - \cos^8 x}{1 - 2\sin^2 \cos^2 x} dx = A\sin 2x + B,$ then A=

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

B. -1

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

D. 1

Answer: A

27. $\int \dfrac{e^x dx}{\cosh x + \sinh x} =$

A. $\log \cosh x + c$

B. $2\log\left(\cosh x + \sinh^{-1}x\right) + c$

C. $\dfrac{1}{2}e^{2x} + c$

D. $x + c$

Answer: D

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28. $\int \dfrac{\sinh x}{1 + \sinh^2 x}dx$

A. $\sech x + c$

B. $-\sech x + c$

C. $\tanh x + c$

D. none

Answer: B

29. $\int \sqrt{1 + 2\cot x(\cot x + \mathrm{cosec}x)}dx =$

30. $\int (1 - \cos x)\mathrm{cosec}^2 x\,dx = f(x) + c \Rightarrow f(x) =$

A. $\sqrt{\cot x + \mathrm{cosec}x} + c$

B. $\tan x/2 + c$

C. $\log|\mathrm{cosec}x - \cot x|c$

D. none

Answer: A

31. $\int (1 - \cos x)\csc^2 x\, dx = f(x) + c \Rightarrow f(x) =$

A. $\tan\dfrac{x}{2}$

B. $\cot\dfrac{x}{2}$

C. $2\tan\dfrac{x}{2}$

D. $\dfrac{1}{2}\tan\dfrac{x}{2}$

Answer: A

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32. $\int \dfrac{x^2 - 1}{x^2 + 1}\, dx =$

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

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

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

D. $x - 2\tan^{-1}x + c$

Answer: D

33. $\int \dfrac{x^4}{x^2 + 1}\,dx$

A. $\dfrac{x^3}{3} - x + \tan^{-1}x + c$

B. $\dfrac{x^5}{5} + \tan^{-1}x + c$

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

D. $\dfrac{x^4}{4} + x + \tan^{-1}x + c$

Answer: A

34. $\int \dfrac{x^5}{x^2 + 1}\, dx =$

A. $\dfrac{x^4}{4} + \dfrac{x^2}{2} + \tan^{-1}x + c$

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

C. $\dfrac{x^4}{4} + \dfrac{x^2}{2} + \tan^{-1}x + c$

D. $\dfrac{x^4}{4} - \dfrac{x^3}{3} - \tan^{-1}e$

Answer: B

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35. $\int \dfrac{1}{x}\left[\dfrac{\sqrt{x - 1}}{\sqrt{x + 1}}\right] dx =$

A. $\cosh^{-1}x - \sec^{-1}x + c$

B. $\cosh^{-1}x + \sec^{-1}x + c$

C. $\sinh^{-1}x - \sec^{-1}x + c$

D. $\sinh^{-1}x - \csc^{-1}x + c$

Answer: A

36. $\int \left[\dfrac{1}{\sqrt{1 - x^2}} + 2^x + e^x \right] dx =$

A. $\sin^{-1}x + \dfrac{2^x}{\log 2} + e^x + e$

B. $\sin^{-1}x - \dfrac{2^x}{\log 2} + e^x + c$

C. $\sin^{-1}x + \dfrac{3^x}{\log 3} + e^x + c$

D. $\cos^{-1}x + \dfrac{2^x}{\log 2} + e^x + c$

Answer: A

37. $\int \dfrac{\sqrt{1-x^2} + \sqrt{1+x^2}}{\sqrt{1-x^4}}\,dx =$

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

B. $\sinh^{-1}x - \sin^{-1}x + c$

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

D. $\tan^{-1}x + \sin^{-1}x + c$

Answer: A

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38. $\int 2^{3x}3^{2x}5^x\,dx =$

A. $\dfrac{2^{3x}3^{2x}5^x}{\log(720)} + c$

B. $\dfrac{2^{3x}3^{2x}5^x}{\log(360)} + c$

C. $\dfrac{2^{3x}3^{2x}5^x}{\log(180)} + c$

D. $\dfrac{2^{3x}3^{2x}5^{x}}{\log(90)} + ce$

Answer: B

39. $\displaystyle\int \dfrac{\left(a^x + b^x\right)^2}{a^x b^x}\,dx =$

A. $\dfrac{(a/b)^x + (b/a)^x}{\log a + \log b} - 2x + c$

B. $\dfrac{(a/b)^x + (b/a)^x}{\log a - \log b} - 2x + c$

C. $\dfrac{(a/b)^x - (b/a)^x}{\log a - \log b} + 2x + c$

D. $\dfrac{(a/b)^x + (b/a)^x}{\log a + \log b} + 2x + c$

Answer: C

40. $\int e^{3-5x}dx =$

A. $-\dfrac{1}{5}e^{3-5x} + c$

B. $\dfrac{1}{5}e^{3-5x} + c$

C. $-\dfrac{1}{2}e^{3-5x} + c$

D. $-\dfrac{1}{5}e^{3-5x} + c$

Answer: A

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41. $\int e^{x\log a}e^{x}dx =$

A. $e^{x\log a} + e^{x} + c$

B. $\dfrac{(ae)^{x}}{\log ae} + c$

C. $\dfrac{x^{x}}{1 + \log a} + c$

D. $\dfrac{\left(ae^{x}\right)}{\log a} + c$

Answer: B

42. $\int \dfrac{1}{\sqrt{4 - 5x}} dx =$

A. $\dfrac{3}{5}\sqrt{4 - 5x} + c$

B. $-\dfrac{2}{5}\sqrt{4 - 5x} + c$

C. $\dfrac{2}{5}\sqrt{4 - 5x} + c$

D. $-\dfrac{2}{5}\sqrt{4 + 5x} + c$

Answer: B

43. $\int \dfrac{1}{(2 - 3x)^2} dx =$

A. $\frac{1}{3}((2 - 3x)) + c$

B. $\frac{4}{3(2 - 3x)} + c$

C. $\frac{1}{3(2 + 3x)} + c$

D. $\frac{2}{(2 - 3x)} + c$

Answer: A

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

A. $\frac{1}{x + 2} + c$

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

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

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

Answer: B

45. $\int \sec^2 5x\,dx =$

A. $\dfrac{2}{1}\tan5x + c$

B. $\dfrac{1}{2}\tan5x + c$

C. $\dfrac{1}{5}\tan5x + c$

D. $\dfrac{1}{3}\tan3x + c$

Answer: C

46. $\int \sec x/3\tan x/3\,dx$

A. $3\sec x/3 + c$

B. $2\sec x/2 + c$

C. $\sec x/3 - c$

D. $2\sec x/3 + c$

Answer: A

47. $\int \sin^2 x \cos^2 x \, dx =$

A. $\dfrac{1}{2}\left(-x\dfrac{\sin 4x}{4}\right) + c$

B. $\dfrac{1}{8}\left(x-\dfrac{\sin 4x}{4}\right) + c$

C. $\dfrac{1}{8}\left(x+\dfrac{\sin 4x}{4}\right) + c$

D. none

Answer: B

48. $\int \cos^3 x \, dx =$

A. $\dfrac{3}{4} \sin x + \dfrac{1}{12} \sin 3x + c$

B. $\dfrac{3}{4} \sin x - \dfrac{1}{12} \sin 3x + c$

C. $-\dfrac{3}{4} \sin x + \dfrac{1}{12} \sin 3x + c$

D. $-\dfrac{3}{4} \sin x - \dfrac{1}{12} \sin 3x + c$

Answer: A

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49. Evaluate the integerals.

$\int \sin^3 x \, dx \, on \, R.$

A. $\dfrac{1}{8} \left[3x + 2\sin 2x - \dfrac{1}{2} \sin 4x \right] + c$

B. $\dfrac{1}{8} \left[3x - 2\sin 2x + \dfrac{1}{2} \sin 4x \right] + c$

C. $\dfrac{1}{8}\left[3x - 2\sin2x - \dfrac{1}{4}\sin4x\right] + c$

D. none

Answer: B

50. $\int \sin^2 x \cos^4 x\, dx =$

A. $\dfrac{x}{16} + \dfrac{\sin2x}{64} + \dfrac{\sin4x}{64} + \dfrac{\sin6x}{192} + c$

B. $\dfrac{x}{6} + \dfrac{\sin2x}{34} - \dfrac{\sin4x}{44} - \dfrac{\sin6x}{192} + c$

C. $\dfrac{x}{16} + \dfrac{\sin2x}{64} - \dfrac{\sin4x}{64} - \dfrac{\sin6x}{192} + c$

D. none

Answer: C

51. $\int \sin 5x \cos 3x \, dx =$

A. $\dfrac{1}{2}\left[\dfrac{\cos 2x}{2} + \dfrac{1}{8}\cos 8x\right] + c$

B. $\dfrac{1}{2}\left[-\dfrac{\cos 2x}{2} + \dfrac{1}{8}\cos 8x\right] + c$

C. $\dfrac{1}{2}\left[-\dfrac{\cos 2x}{2} - \dfrac{1}{8}\cos 8x\right] + c$

D. none

Answer: C

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52. $\int \cos 4x \cos 3x \, dx =$

A. $\dfrac{1}{2}\left[-\dfrac{1}{7}\sin 7x + \sin\right] + c$

B. $\dfrac{1}{2}\left[\dfrac{1}{7}\sin 7x + \sin\right] + c$

C. $\dfrac{1}{2}\left[\dfrac{1}{7}\sin 7x - \sin\right] + c$

D. none

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53. $\int \cos x \cos 2x \cos 3x \, dx =$

A. $\dfrac{1}{4}\left[\dfrac{1}{6}\sin 6x + \dfrac{1}{2}\sin - \dfrac{1}{4}\sin 4x + x\right] + c$

B. $\dfrac{1}{4}\left[\dfrac{1}{6}\sin 6x - \dfrac{1}{2}\sin - \dfrac{1}{4}\sin 4x + x\right] + c$

C. $\dfrac{1}{4}\left[\dfrac{1}{6}\sin 6x + \dfrac{1}{2}\sin 2x + \dfrac{1}{4}\sin 4x + x\right] + c$

D. none

54. $\int \sqrt{1 + \cos x}\, dx =$

A. $\sqrt{2}\sin x/2 + c$

B. $2\sqrt{2}\sin x/2 + c$

C. $3\sqrt{2}\sin x/2 + c$

D. none

Answer: B

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55. $\int \sqrt{1 + \sin x}\, dx =$

A. $2\sin x/2 + 2\cos x/2 + c$

B. $2\sin x/2 - \cos + c$

C. $2\sin x/2 - \cos x/2 + c$

D. none

Answer: C

56. If $x \in (-\pi, \pi)$ then $\int \sqrt{1 + \sin x/2} dx =$

A. $2[\sin x/4 - \cos x/4] + c$

B. $4[\sin x/4 + \cos x/4] + c$

C. $4[\sin x/4 - \cos x/2] + c$

D. $4[\sin x/4 - \cos x/4] + c$

Answer: D

57. $\int \dfrac{1 + \cos x}{1 - \cos x} dx =$

A. $2\cot x/2 - x + c$

B. $-2\cot x/2 - x + c$

C. $-2\cot x/2 + x + c$

D. none

Answer: B

58. $\int \dfrac{\tan x}{1 + \tan^2 x} dx =$

A. $\dfrac{1}{2}\cos 2x + c$

B. $-\dfrac{1}{2}\cos 2x + c$

C. $\dfrac{1}{4}\cos 2x + c$

D. $-\dfrac{1}{4}\cos 2x + c$

Answer: D

59. $\int x\cos\left(x^2\right)dx =$

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

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

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

D. none

Answer: A

60. $\int x\sin\left(-x^2\right)dx =$

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

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

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

D. none

Answer: B

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61. $\int x^2 \sin\left(x^3\right) dx$

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

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

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

D. none

Answer: A

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62. $\int x^3 \sec^2\left(x^4\right) dx =$

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

B. $-\dfrac{1}{2}\tan\left(x^4\right) + c$

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

D. none

Answer: C

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63. $\int 2x\left(x^2 + 1\right)^5 dx =$

A. $\dfrac{1}{6}\left(x^2 + 1\right)^6 + c$

B. $\dfrac{1}{6}\left(x^2 - 1\right)^6 + c$

C. $-\dfrac{1}{6}\left(x^2 + 1\right)^6 + c$

D. $\dfrac{1}{6}\left(x^2 + 1\right)^6 + c$

Answer: D

64. $\int \dfrac{x}{\sqrt{x^2 + 1}} dx =$

A. $\sqrt{x^2 + 1} + c$

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

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

D. none

Answer: A

65. $\int (4x + 3)\sqrt{2x^2 + 3x + 5} dx =$

A. $\dfrac{1}{3}\left(2x^2 + 3x + 5\right)^{3/2} + c$

B. $\dfrac{2}{3}\left(2x^2 + 3x + 5\right)^{3/2} + c$

C. $\dfrac{2}{3}\left(2x^2 - 3x - 5\right)^{3/2} + c$

D. $\dfrac{2}{3}\left(2x^2 + 3x + 5\right)^{3/2} + c$

Answer: D

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66. $\displaystyle\int \dfrac{1}{\sin x\cos^2 x}\,dx =$

A. $\log\left|\tan\dfrac{x}{2}\right| + \sec x + c$

B. $\log\left|\tan\dfrac{x}{2}\right| - \sec x + c$

C. $\log\left|\tan\dfrac{x}{2}\right| + \sec x + c$

D. none

67. $\int \dfrac{\cos 2x}{(\cos x - \sin x)^2} dx =$

A. $\log| - 1\sin 2x| + c$

B. $\log|\cos x\sin x| + c$

C. $-\log|\cos x - \sin x| + c$

D. $\dfrac{1}{\cos x - \sin x} + c$

68. $\int \dfrac{1 + \cos 4x}{\cot x - \tan x} dx =$

A. $-\dfrac{1}{4}\cos4x + c$

B. $-\dfrac{1}{8}\cos4x + c$

C. $\dfrac{1}{4}\sin4x + c$

D. $-\dfrac{1}{8}\sin4x + c$

Answer: B

69. $\displaystyle\int \dfrac{\sin^{-1}x}{\sqrt{1 - x^2}}dx =$

A. $\dfrac{1}{2}\sin^{-1} + c$

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

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

D. $-\dfrac{1}{8}\cos4x + c$

Answer: B

70. $\int \dfrac{1}{\left(1 + e^x\right)\left(1 + e^{-x}\right)} dx =$

A. $- \dfrac{1}{1 + e^x} + c$

B. $\dfrac{1}{1 + e^x} + c$

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

D. $\dfrac{1}{1 - e^x} + c$

Answer: A

71. $\int \dfrac{\sin^6 x}{\cos^8 x} dx =$

A. $\tan 7x + c$

B. $\dfrac{1}{9}\tan^9 x + c$

C. $\dfrac{1}{7}\tan 7x + c$

D. $\sec^{2x} + c$

Answer: B

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72. $\displaystyle\int \dfrac{\tan^9 x}{\sin x \cos x}dx =$

A. $\dfrac{1}{10}\tan^9 x + c$

B. $\dfrac{1}{5}\tan^9 x + c$

C. $\dfrac{1}{7}\tan^9 x + c$

D. none

Answer: B

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73. $\int \dfrac{\sec x}{a\cos x + b\sin x} dx =$

A. $\dfrac{1}{a}\log|a\cot x + b| + c$

B. $a\log|a + b\tan x| + c$

C. $b\log|a + b\tan x| + c$

D. $\dfrac{1}{b}\log|a + b\tan x| + c$

Answer: D

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74. $\int \dfrac{1}{\sqrt{x}(1 + x)} dx =$

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

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

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

D. none

Answer: A

75. $\displaystyle\int \frac{x\sin^{-1}\left(x^2\right)}{\sqrt{1-x^4}}\,dx =$

A. $\dfrac{1}{4}\left(\sin^{-1}x^2\right) + c$

B. $\dfrac{1}{3}\left(\sin^{-1}x^2\right) + c$

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

D. none

Answer: A

76. $\int \dfrac{\cos\left(\cot^{-1}x\right)}{1 + x^2}\,dx =$

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

B. $\sin\left(\cot^{-1}x\right)$

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

D. none

Answer: C

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77. $\int \dfrac{x^{49}\tan^{-1}\left(x^{50}\right)}{\left(1 + x^{100}\right)}\,dx = k\left(\tan^{-1}\left(x^{50}\right)\right)^2 + c \Rightarrow k =$

A. $1/50$

B. $-1/50$

C. $1/100$

D. -1/100

Answer: C

78. $\int \dfrac{x + \sin^{-1}x}{\sqrt{1 - x^2}} = dx$

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

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

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

D. none

Answer: A

79. $\int \dfrac{\tan\left(\sin^{-1}x\right)}{\sqrt{1-x^2}}\,dx =$

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

B. $-\log\left|\cos\left(\sin^{-1}x\right)\right| + c$

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

D. none

Answer: B

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80. $\int \dfrac{e^x}{\sqrt{1+\left(e^x\right)}}\,dx =$

A. $\sqrt{e^x - 1} + c$

B. $\sqrt{e^x + 1} + c$

C. $3\sqrt{e^x + 1} + c$

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

Answer: D

81. $\int \dfrac{1}{\sqrt{x}} \cos\left(\sqrt{x}\right) dx =$

A. $3\sin\sqrt{x} + c$

B. $2\sin\sqrt{x} + c$

C. $\sin\sqrt{x} + c$

D. none

Answer: B

82. $\int \dfrac{2}{x\left[1 + (\log x)^2\right]}\,dx =$

A. $2m^{-1}(\log x) + c$

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

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

D. none

Answer: C

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83. $\int \sin^3 x \cos x\, dx =$

A. $\dfrac{1}{2}\sin^4 x + c$

B. $\dfrac{1}{4}\sin^4 x + c$

C. $\dfrac{1}{3}\sin^4 x + c$

D. none

Answer: B

84. $\int \sec^2 x \tan^2 x \, dx =$

A. $\dfrac{1}{2} \tan^3 x + c$

B. $\tan^3 x + c$

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

D. none

Answer: C

85. $\int \sin^{5/2}x \cos^3 x \, dx =$

A. $2\sin^{7/2}x \left[\dfrac{1}{7} + \dfrac{1}{11}\sin^2 x \right] + c$

B. $2\sin^{7/2}x \left[\dfrac{1}{7} - \dfrac{1}{11}\sin^2 x \right] + c$

C. $3\sin^{7/2}x \left[\dfrac{1}{5} - \dfrac{1}{9}\sin^2 x \right] + c$

D. none

Answer: B

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86. $\int \tan^4 x \, dx =$

A. $\dfrac{1}{3}\tan^3 x + x + c$

B. $\tan^3 x - \tan x - x + c$

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

D. $\tan^3 x - \tan x + x + c$

Answer: C

87. $\int \dfrac{(1 + x)e^x}{\sin^2\left(xe^x\right)} dx =$

A. $-\cot\left(xe^x\right) + c$

B. $\cot\left(xe^x\right) - c$

C. $\cot\left(xe^x\right) + c$

D. none

Answer: A

88. $\int \dfrac{(1 + x)e^x}{\cos^2\left(xe^x\right)} dx =$

A. $\cot\left(xe^x\right) + c$

B. $\tan\left(xe^x\right) + c$

C. $\sin\left(xe^x\right) + c$

D. none

Answer: B

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89. $\int e^{\sin^2 x + \cos x}(\sin 2x - \sin x)dx =$

A. $-e^{\sin^2 x + \cos x} + c$

B. $e^{\sin^2 x + \cos x} + c$

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

D. none

Answer: B

90. $\int \dfrac{x^3}{\sqrt{1 - x^8}} dx =$

A. $\dfrac{1}{4}\sin^{-1}\left(x^4\right) + c$

B. $\dfrac{1}{2}\sin^{-1}\left(x^4\right) + c$

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

D. none

Answer: A

91. $\int\left[\dfrac{\sqrt{x}}{\sqrt{a^3 - x^3}}\right] dx = g(x) + c \Rightarrow g(x) =$

A. $\dfrac{2}{3}\cos^{-1} - x$

B. $\dfrac{2}{3}\sin^{-1}\left(\dfrac{x^3}{a^3}\right)$

C. $\dfrac{2}{3}\sin^{-1}\left(\dfrac{\sqrt{x^3}}{\sqrt{a^3}}\right)$

D. $\dfrac{2}{3}\cos^{-1}\left(\dfrac{x}{a}\right)$

Answer: C

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92. $\int\dfrac{dx}{x^2\sqrt{4 + x^2}} =$

A. $\dfrac{1}{4}\sqrt{4 + x^2} + c$

B. $\dfrac{-1}{4}\sqrt{4 + x^2} + c$

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

D. $\dfrac{9}{4x}\sqrt{4 + x^2} + c$

Answer: C

93. $\displaystyle\int \dfrac{x}{1 + x^4}\,dx =$

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

B. $\dfrac{1}{4}\tan^{-1}\left(x^2\right) + c$

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

D. none

Answer: A

94. $\int \dfrac{x^3}{1 + x^8} dx =$

A. $\dfrac{1}{2}\tan^{-1}x^4 + c$

B. $\dfrac{1}{3}\tan^{-1}x^4 + c$

C. $\dfrac{1}{4}\tan^{-1}x^4 + c$

D. none

Answer: C

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95. $\int \dfrac{x^4 + 1}{1 + x^6} dx =$

A. $\tan^{-1}(x) - \tan^1 x^3\Big) + c$

B. $\tan^{-1}(x) - \dfrac{1}{3}\tan^{-1}\Big(x^3\Big) + c$

C. $\tan^{-1}(x) + \tan^{-1}\Big(x^3\Big) + c$

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

Answer: D

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96. $\displaystyle\int \dfrac{x^3 - 1}{x^3 + x}\,dx =$

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

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

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

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

Answer: B

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97. $\int \dfrac{x^3 + 1}{x^2 + 1} dx$

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

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

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

D. none

Answer: A

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98. The integral $\int \dfrac{dx}{x^2\left(x^4 + 1\right)^{3/4}}$ equals

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

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

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

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

Answer: D

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

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

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

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

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

Answer: B

100. $\int \dfrac{\sin 2x}{1 + \sin^4 x} dx =$

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

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

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

D. none

Answer: A

101. $\int \dfrac{1 + \cos x}{(x + \sin x)^2} dx =$

A. $\dfrac{1}{x - \sin x} + c$

B. $\dfrac{1}{x + \sin x} + c$

C. $-\dfrac{1}{x + \sin x} + c$

D. none

Answer: C

102. $\displaystyle\int \dfrac{x + 1}{\sqrt{x^2 + 2x + 3}}\,dx =$

A. $\sqrt{x^2 + 2x + 3} + c$

B. $2\sqrt{x^2 + 2x + 3} + c$

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

D. none

Answer: A

103. $\int \dfrac{1}{\sqrt{e^{2x} - 1}} dx =$

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

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

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

D. none

Answer: C

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104. $\int \dfrac{\cos x}{\sqrt{2 + 3\sin x}} dx =$

A. $\dfrac{2}{3}\sqrt{2 + 3\sin x} + c$

B. $\dfrac{2}{3}\sqrt{2 + 3\sin x} - c$

C. $\dfrac{2}{3}\sqrt{2 - 3\sin x} + c$

D. none

Answer: A

105. $\int \dfrac{\sin 2x}{a\cos^2 x + b\sin^2 x} dx =$

A. $\dfrac{1}{b + a} \log \left| \cos^2 x + b\sin^2 x \right| + c$

B. $\dfrac{1}{b - a} \log + \left| a\cos^2 x - b\sin^2 x \right| c$

C. $\dfrac{1}{b - a} \log \left| a\cos^2 + x + b\sin^2 x \right| + c$

D. none

Answer: C

106. $\int \dfrac{\log\left(1 + \dfrac{1}{x}\right)}{x(1 + x)} dx =$

A. $\dfrac{[\log(x + 1)]^2}{2} - \dfrac{(\log x)^2}{2} + \log(x + 1) + c$

B. $-\dfrac{1}{2}\log^2(1 + 1/x) + c$

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

D. $\dfrac{-1}{2}\left[\log(x + 1)^2 + \log(x + 1)\log x + c\right.$

Answer: B

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107. $\int \dfrac{\sec x}{(\sec x + \tan x)^2} dx =$

A. $-\dfrac{1}{2(\sec x + \tan x)^2} + c$

B. $\dfrac{1}{(\sec x + \tan x)^2} + c$

C. $\dfrac{1}{2(\sec x - \tan x)^2} + c$

D. none

Answer: A

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108. $\int \dfrac{\sec x}{\sqrt{\sec x + \tan x}} dx =$

A. $\dfrac{-2}{\sqrt{\sec x + \tan x}} + c$

B. $\dfrac{2}{\sqrt{\sec x + \tan x}} + c$

C. $2\sqrt{\sec + \tan x} + c$

D. none

Answer: A

109. $\int \dfrac{\sec^2 x}{(\sec x + \tan x)^5} dx =$

A. $\dfrac{1}{4(\sec x + \tan x)^4}\left[\dfrac{1}{2} - \dfrac{1}{(3\sec x + \tan x)^2}\right] + c$

B. $-\dfrac{1}{4(\sec x + \tan x)^4}\left[\dfrac{1}{2} + \dfrac{1}{3}(\sec x + \tan x)^2\right] + c$

C. $-\dfrac{1}{4(\sec x + \tan x)^4}\left[\dfrac{1}{3} + \dfrac{1}{(3\sec x + \tan x)^2}\right] + c$

D. none

Answer: B

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110. $\int \sec x \log(\sec x + \tan x) dx =$

A. $[\log(\sec x + \tan x)]^2 + c$

B. $\dfrac{1}{2}[\log(\sec x - \tan x)]^2 + c$

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

D. $\frac{1}{3}[\log(\sec x + \tan x)]^2 + c$

Answer: C

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111. $\int(1 + 2)\tan x(\tan x + \sec x)\}^{1/2}dx =$

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

B. $\log|\sec x(\sec x + \tan x)| + c$

C. $\log\left|\dfrac{scx}{\sec x + \tan x}\right| + c$

D. $\log|\cos x(\sec x + \tan x)| + c$

Answer: B

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112. $itncosecxlog(cosecx - cotx)dx =$

A. $\dfrac{1}{2}\log^2(cosecx + cot) + c$

B. $\dfrac{1}{2}\log^2(cosecx - cot) + c$

C. $-\dfrac{1}{2}\log^2(cosecx - cot) + c$

D. $\dfrac{1}{3}\log^2(cosecx - cot) + c$

Answer: B

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113. $\displaystyle\int \dfrac{sec^2x}{\sqrt{a + btanx}}dx =$

A. $\dfrac{1}{b}2\sqrt{a + btanx} + c$

B. $-\dfrac{1}{b}2\sqrt{a + btanx} + c$

C. $\dfrac{1}{b}2\sqrt{a - btanx} + c$

D. none

Answer: A

114. $\int \dfrac{\log(\tan x)}{\sin x \cos x} dx =$

A. $\log^2(\tan x) + c$

B. $\dfrac{1}{2}(\log\tan x)^2 + c$

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

D. none

Answer: B

115. $\int \dfrac{\left[x + \sqrt{a^2 + x^2}\right]^n}{\sqrt{a^2 + x^2}} dx (n \neq 0) =$

A. $\dfrac{1}{n+1}\left(x + \sqrt{a^2 + x^2}\right)^{n+1} + c$

B. $\dfrac{1}{n \cdot \left(x + \sqrt{a^2 + x^2}\right)^{n}} + c$

C. $\left(x + \sqrt{a^2 + x^2}\right)^{n} + c$

D. $\dfrac{1}{n}\left(x + \sqrt{a^2 + x^2}\right)^{n} + c$

Answer: D

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116. If $\int(\sin2x - \cos2x)dx = \dfrac{1}{\sqrt{2}}\sin(2x - a) + c$ then $a =$

A. $5\pi/4$

B. $-5\pi/4$

C. $\pi/4$

D. $3\pi/4$

Answer: B

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117. $\int \dfrac{\sin x \cos x}{\sin^4 + \cos^4 x} dx =$

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

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

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

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

Answer: C

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118. $\int \dfrac{\sin x \cos x}{1 + \cos^4 x} dx =$

A. $\dfrac{1}{2}\cot^{-1}\left(\cos^2 x\right) + c$

B. $\dfrac{1}{2}\tan^{-1}\left(\cos^2 x\right) + c$

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

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

Answer: A

119. $\displaystyle\int \dfrac{\sec^2 x}{\log(\tan x)^{\tan x}}\,dx =$

A. $\log\left|\log(\tan x)^{\tan x}\right| + c$

B. $\log(\tan x) + c$

C. $\log|\log(\tan x)| + c$

D. $\log\left|\dfrac{\log\tan x}{\tan x}\right| + c$

Answer: C

120. $\int \sec^m x \cdot \tan x \, dx =$

A. $\dfrac{1}{m} \sec^m x + c$

B. $-\dfrac{1}{m} \sec^m x + c$

C. $\dfrac{1}{\cos^m x} + c$

D. none

Answer: A

121. $\int \dfrac{dx}{\sqrt{\sin^3 x \cos x}} = g(x) + c \Rightarrow g(x) =$

A. $\dfrac{-2}{\sqrt{\tan x}}$

B. $\dfrac{2}{\sqrt{\cot x}}$

C. $\dfrac{2}{\sqrt{\tan x}}$

D. $\dfrac{-2}{\sqrt{\cot x}}$

Answer: A

122. $\int \dfrac{x^3}{1 + x^4} dx =$

A. $\dfrac{1}{4} \log \left(1 - x^4 \mid \ + c \right.$

B. $\dfrac{1}{2} \log \left| 1 + x^4 \right| + c$

C. $\dfrac{1}{4} \log \left| 1 + x^4 \right| + c$

D. none

Answer: C

123. $\int \dfrac{x - 2}{x^2 - 4x + 5} dx =$

A. $\dfrac{1}{2}\log\left|x^2 - 4x - 5\right| + c$

B. $\dfrac{1}{4}\log\left|x^2 - 4x + 5\right| + c$

C. $\dfrac{1}{2}\log\left|x^2 + 4x + 5\right| + c$

D. $\dfrac{1}{2}\log\left|x^2 - 4x + 5\right| + c$

Answer: D

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124. $\int \dfrac{dx}{x(1 + \log x)^3} =$

A. $\dfrac{-1}{2(1 + \log x)^2} + c$

B. $\dfrac{1}{2(1 + \log x)^2} + c$

C. $\dfrac{1}{1 + \log x} + c$

D. $\dfrac{-1}{3(1 + \log x)^3} + c$

Answer: A

125. $\displaystyle\int \dfrac{1 + \log x}{1 + x\log x}\,dx =$

A. $\log|1 + x\log x| + c$

B. $\log|x\log x| + c$

C. $\log|1 + \log x| + c$

D. $1 + x\log x + c$

Answer: A

126. Evaluate the integerals.

$$\int \frac{1}{x \log x [\log g(\log x)]} dx \, on \, (1, \infty)$$

A. $\log|\log(\log x)| + c$

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

C. $1/\log \sin x + c$

D. none

Answer: A

127. $\int \dfrac{1}{\log\left(x^x\right)(\log \ x + 1)} \, dx =$

A. $\log|\log x + 1| + c$

B. $\log\left|\dfrac{\log x + 1}{\log x}\right| + c$

C. $\log \left| \dfrac{\log x}{\log x + 1} \right| + c$

D. none

Answer: C

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128. $\displaystyle\int \dfrac{3\cos 3x - 2\sin 2x}{\cos 2x + \sin 3x} dx =$

A. $-\log|\cos 2x - \sin 3x| + c$

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

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

D. none

Answer: C

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129. $\int \dfrac{\cot x}{\log(\sin x)} dx =$

A. $\log|\log(\sin x)| + c$

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

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

D. none

Answer: A

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130. $\int \dfrac{1 - \tan x}{1 + \tan x} dx =$

A. $\log|\cos x - \sin x| + c$

B. $\log|\cos x + \sin x| + c$

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

D. none

Answer: B

131. $\int \dfrac{1}{\left(1 + x^2\right) \tan^{-1} x} dx =$

A. $\log \left| \cot^{-1} x \right| + c$

B. $\log \left| \tan^{-1} x \right| + c$

C. $\log \left| \cos^{-1} x \right| + c$

D. none

Answer: B

132. $\int \dfrac{\sec^2 x}{3 + 4\tan x} dx =$

A. $\dfrac{1}{2}\log|2 + 4\tan x| + c$

B. $\dfrac{1}{4}\log|3 + 4\tan x| + c$

C. $\dfrac{1}{4}\log|3 - 4\tan x| + c$

D. $\dfrac{1}{4}\log|2 + 3\tan x| + c$

Answer: B

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133. $\int \sec x \cosec x \, dx =$

A. $\log|\tan x| + c$

B. $-\log|\tan x| + c$

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

D. none

Answer: A

134. $\int \dfrac{-a\sin x + b\cos x}{b\sin x + a\cos x} dx =$

A. $\log|b + a\tan x| + c$

B. $\dfrac{1}{a + b}\log|a\cos x + b\sin x| + c$

C. $\log|b\cos x - a\sin x| + c$

D. $\log|a\cos x + b\sin x| + c$

Answer: D

135. $\int \dfrac{f'(x)}{f(x)\log f(x)} dx =$

A. $\dfrac{f(x)}{\log f(x)} + c$

B. $f(x) \cdot \log f(x) + c$

C. $\log|\log f(x)| + c$

D. none

Answer: C

136. $\int \dfrac{\cos x}{\sin x \log \sin x} dx =$

A. $\log|\sin x \log \sin x| + c$

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

C. $1/\log \sin x + c$

D. none

Answer: B

137. $\int x^{-2/3} \left(1 + x^{1/2}\right)^{-5/3} dx =$

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

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

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

D. none

Answer: B

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138. $\int \dfrac{1}{\sqrt{x} + x} dx =$

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

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

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

D. $2\log\left(1 + \sqrt{x}\right) + c$

Answer: D

139. $\displaystyle\int \frac{1}{\sec x + \tan x}\,dx =$

A. $-\log|1 + \sin x| + c$

B. $\log|1 + \sin x| + c$

C. $\log|1 - \sin x| + c$

D. none

Answer: B

140. $\int \dfrac{\tan x - \tan x/2}{1 + \tan x \tan x/2} dx =$

A. $2\log|\sec x/2| + c$

B. $2\log|\cos x/2| + c$

C. $2\log|\cos x/2| + c$

D. none

Answer: A

141. $\int \dfrac{1 - \tan x/2}{1 + \tan x/2} dx =$

A. $2\log|\sec x/2| + c$

B. $2\log|\cos x/2| + c$

C. $2\log|\sec(\pi/4 - x/2)| + c$

D. $2\log|\cos(\pi/4 - x/2)| + c$

Answer: D

142. $\int \left[\tan\dfrac{x}{2} + \tan\left(\dfrac{\pi}{2} - \dfrac{x}{2}\right) \right] dx =$

A. $2\log |\tan x/2)|+c$

B. $2\log |\sin x/2 + \cos x/2) | + c$

C. $\log|\cot x/2| + c$

D. none

Answer: A

143. $\int \dfrac{f'(x)}{\sqrt{f(x)}} dx =$

A. $\dfrac{1}{2}\log|f(x)| + c$

B. $\sqrt{f(x)} + c$

C. $2\sqrt{fx}\,)) + c$

D. none

Answer: C

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144. $\int \dfrac{\sin 5x}{\sqrt{\cos 5x}} dx =$

A. $\dfrac{2}{3}\sqrt{\cos 5x} + c$

B. $-\dfrac{2}{5}\sqrt{\cos 5x} + c$

C. $10\sqrt{\cos 5x} + c$

D. none

Answer: B

145. $\int \dfrac{1}{\cos x \sqrt{\sin x \cos x}} dx =$

A. $\sqrt{\tan x} + c$

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

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

D. $\sqrt{\cos x} + c$

Answer: B

146. $\int \dfrac{\sqrt{cotx}}{sinxcosx} dx = -f(x) + c \Rightarrow f(x) =$

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

B. $2\sqrt{cotx} + c$

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

D. $-2\sqrt{tanx} + c$

Answer: C

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147. $\int \dfrac{\sqrt{cotx}}{sinxcosx} dx = -f(x) + c \Rightarrow f(x) =$

A. $2\sqrt{tanx}$

B. $-2\sqrt{tanx}$

C. $-2\sqrt{cotx}$

D. $2\sqrt{\cot x}$

Answer: D

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148. $\int \dfrac{e^x - e^{-x}}{e^x + e^{-x}} dx =$

A. $\log\left|e^x + e^{-x}\right| + c$

B. $\log\left|e^x - e^{-x}\right| + c$

C. $-\log\left|e^x - e^{-x}\right| + c$

D. none

Answer: A

149. Evaluate the integerals.

$\int \dfrac{dx}{1 + e^x}, x \in R$

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

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

C. $\log\left|1 + e^x\right| + c$

D. none

Answer: A

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150. $\int \dfrac{e^x}{e^{x/2} - 1} dx =$

A. $2\left[e^{x/2} - 1 - \log \mid e^{x/2} + 1\right] + c$

B. $2\left[e^{x/2} + 1 + \log\left|e^{x/2} + 1\right|\right] + c$

C. $2\left[e^{x/2} + 1 - \log\left|e^{x/2} + 1\right|\right] + c$

D. $2\left[e^{x/2} - 1 + \log\left|e^{x/2} - 1\right|\right] + c$

Answer: D

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151. If $\int \dfrac{e^x - 1}{e^x + 1} dx = f(x) + c$, then $f(x) =$

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

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

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

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

Answer: C

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

A. $(x + 1)e^{x+1/x} + c$

B. $-xe^{x+1/x} + c$

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

D. $xe^{x+1/x} + c$

Answer: D

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153. $\int \dfrac{e^x + e^{-x}}{\left(e^x - e^{-x}\right)\log\sinh x}dx =$

A. $\log|\cosh x| + c$

B. $\log(\log\cosh x) + c$

C. $\log(\log\sinh x) + c$

D. none

Answer: C

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154. $\int 5^{5^{5^x}} \cdot 5^{5^x} \cdot 5^x dx =$

A. $\dfrac{5^{5^x}}{(\log 5)^3} + c$

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

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

D. none

Answer: C

155. $\displaystyle\int \frac{\left(x^2 - 1\right)dx}{\left(x^4 + 3x^2 + 1\right)\tan^{-1}\left(\frac{x^2+1}{x}\right)} =$

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

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

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

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

Answer: C

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156. $\displaystyle\int \frac{\cos 2x}{\cos x}dx =$

A. $\sin x - \log|\sec x - \tan x| + c$

B. 2sin$x$ - log|sec$x$ - tan$x$| + c

C. sin$x$ - log|sec$x$ + tan$x$| + c

D. 2sin$x$ - log|sec$x$ + tan$x$| + c

Answer: D

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157. $\int \dfrac{\cos(x - a)}{\sin x} dx =$

A. cos$a$log|sin$x$| - $x$sin$a$ + c

B. cos$a$log|sin$x$| + $x$sin$a$ + c

C. cos$a$log|sin$x$| + $x$tan$a$ + c

D. none

Answer: B

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158. If $\int \dfrac{\sin x}{\sin(x - \alpha)} dx = Ax + B\log\sin(x - \alpha) + C$, then value of (A,B)

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

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

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

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

Answer: D

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159. $\int \dfrac{\sin(x - a)}{\sin(x - b)} dx =$

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

B. $x\cos(b + a) + \sin(b + a)\log|\sin(x + b)| + c$

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

D. none

Answer: A

160. $\int \dfrac{\sin(x - a)}{\cos(x - b)} dx =$

A. $\cos(b + a)\log|\sec(x + b)| + x\sin(b - a) + c$

B. $\cos(b - a)\log|\sec(x - b)| + x\sin(b - a) + c$

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

D. none

Answer: B

161. $\int \dfrac{1}{\sin(x - a)\sin(x - b)} dx =$

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

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

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

D. none

Answer: C

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162. $\int \dfrac{dx}{\cos(x + 4)\cos(x + 2)} =$

A. $\dfrac{1}{\sin} \log \mid \cos(x + 4)^2 \mid + c$

B. $\dfrac{1}{2} \log \left| \dfrac{\sin(x + 2)}{\sin(x + 2)} \right| + c$

C. $\dfrac{1}{\sin 2} \log \left| \dfrac{\sec(x + 4)}{\sin(x + 2)} \right| + c$

D. $\log\left|\dfrac{\sin(x + 4)}{\sin(x + 2)}\right| + c$

Answer: C

163. $\displaystyle\int\left[\dfrac{\sqrt{\sin(x + \alpha)}}{\sin(x - \alpha)}\right]dx =$

A. $\sin \cdot \cosh^{-1}\left(\dfrac{\sin x}{\sin\alpha}\right) - \cos\alpha \cdot \sin^{-1}\left(\dfrac{\cos x}{\cos\alpha}\right) + c$

B. $\sin \cdot \cosh^{-1}\left(\dfrac{\sin x}{\sin\alpha}\right) - \tan\alpha \cdot \sin^{-1}\left(\dfrac{\cos x}{\cos\alpha}\right) + c$

C. $\sin \cdot \cosh^{-1}\left(\dfrac{\sin x}{\sin\alpha}\right) + \cos\alpha \cdot \sin^{-1}\left(\dfrac{\cos x}{\cos\alpha}\right) + c$

D. none

Answer: A

164. $\int \dfrac{f(x)g'(x) - f'(x)g(x)}{f(x)g(x)} [\log(g(x)) - \log(f(x))]dx =$

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

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

C. $\dfrac{g(x)}{f(x)}\log\left(\dfrac{\log g(x)}{f(x)}\right) + c$

D. $\log\left[\dfrac{g(x)}{f(x)}\right] - \dfrac{g(x)}{f(x)} + C$

Answer: B

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EXERCISE 1B

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1. $\int \dfrac{3dx}{2x^2 - x - 1} =$

A. $\log\left|\dfrac{x-1}{x+1}\right| + c$

B. $\log\left|\dfrac{x+1}{x+1}\right| + c$

C. $\log\left|\dfrac{x-1}{2x-1}\right| + c$

D. $\log\left|\dfrac{x-1}{2x+1}\right| + c$

Answer: D

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2. $\displaystyle\int \dfrac{1}{x^2 - 3x + 2} dx =$

A. $\log\left|\dfrac{x-1}{x-2}\right| + c$

B. $\log\left|\dfrac{x-2}{x-1}\right| + c$

C. $\log\left|\dfrac{x+2}{x+1}\right| + c$

D. none

Answer: B

3. $\int \dfrac{2x + 3}{(2x + 1)(1 - 3x)} dx =$

A. $\dfrac{2}{5}\log|2x + 1| - \dfrac{11}{15}\log|1 - 3x| + c$

B. $\dfrac{2}{5}\log|2x + 1| - \dfrac{11}{15}\log|1 + 3x| + c$

C. $\dfrac{2}{3}\log|2x - 1| + \dfrac{11}{15}\log|1 - 3x| + c$

D. $\dfrac{2}{5}\log|2x + 1| - \dfrac{21}{5}\log|1 + 3x| + c$

Answer: A

4. $\int \dfrac{2x + 1}{x^2(x + 1)} dx =$

A. $x\log\left|\dfrac{x}{x + 1}\right| - \dfrac{1}{x} + c$

B. $\log \left| \dfrac{x}{2x + 1} \right| - \dfrac{1}{x} + c$

C. $\log \left| \dfrac{x}{x + 1} \right| - \dfrac{1}{x} + c$

D. $\log \left| \dfrac{x}{x - 1} \right| + \dfrac{1}{x} + c$

Answer: C

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5. $\int \dfrac{1}{x^2(x + 1)} dx =$

A. $\log \left| \dfrac{x + 1}{x} \right| + \dfrac{1}{x} + c$

B. $\log \left| \dfrac{x - 1}{x} \right| + \dfrac{1}{x} + c$

C. $\log \left| \dfrac{x - 1}{x} \right| - \dfrac{1}{x} + c$

D. $\log \left| \dfrac{x + 1}{x} \right| - \dfrac{1}{x} + c$

Answer: D

6. $\int \dfrac{3x + 1}{(x - 1)^2(x + 3)} dx =$

A. $\log \left| \dfrac{x - 1}{x + 3} \right| - \dfrac{1}{x - 1} + c$

B. $\dfrac{1}{2} \log \left| \dfrac{x - 1}{x + 3} \right| - \dfrac{1}{x - 1} + c$

C. $\dfrac{1}{2} \log \left| \dfrac{x - 1}{x + 3} \right| + \dfrac{1}{x - 1} + c$

D. none

Answer: B

7. If $\int \dfrac{dx}{x - x^3} = A \log \left| \dfrac{x^2}{1 - x^2} \right| + c$ then A=

A. 2

B. 1/2

C. 2/3

D. 1/3

Answer: B

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8. $\int \dfrac{1}{(x-2)\left(x^2+1\right)} dx =$

A. $\dfrac{1}{5}\left[\log|x+2| - \dfrac{1}{2}\log\left(x^2+1\right) + 2\tan^{-1}x\right] + c$

B. $\dfrac{1}{5}\left[\log|x-2| - \dfrac{1}{2}\log\left(x^2+1\right) - 2\tan^{-1}x\right] + c$

C. $\dfrac{1}{2}\left[\log|x-2| + \dfrac{1}{2}\log\left(x^2-1\right) - 2\tan^{-1}x\right] + c$

D. none

Answer: B

9. $\int \dfrac{1}{x\left(x^8 - 1\right)} dx =$

A. $\dfrac{1}{4} \log \left| \dfrac{x^8 - 1}{x^8} \right| + c$

B. $\dfrac{1}{8} \log \left| \dfrac{x^8 - 1}{x^8} \right| + c$

C. $\dfrac{1}{8} \log \left| \dfrac{x^8 + 1}{x^8} \right| + c$

D. none

Answer: B

10. $\int \dfrac{1}{\left(x^2 - 1\right)\left(x^2 + 2\right)} dx =$

A. $\dfrac{1}{3}\left[\dfrac{1}{2}\log\left|\dfrac{x+1}{x-1}\right| - \tan^{-1}\dfrac{x}{\sqrt{2}}\right] + c$

B. $\dfrac{1}{3}\left[\dfrac{1}{2}\log\left|\dfrac{x-1}{x+1}\right| + \dfrac{1}{\sqrt{2}}\tan^{-1}\dfrac{x}{\sqrt{2}}\right] + c$

C. $\dfrac{1}{3}\left[\dfrac{1}{2}\log\left|\dfrac{x-1}{x+1}\right| - \dfrac{1}{\sqrt{2}}\tan^{-1}\dfrac{x}{\sqrt{2}}\right] + c$

D. $\dfrac{1}{3}\left[\dfrac{1}{3}\log\left|\dfrac{x-1}{x+1}\right| - \dfrac{1}{2\sqrt{2}}\tan^{-1}\dfrac{x}{\sqrt{2}}\right] + c$

Answer: C

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11. $\displaystyle\int \dfrac{1}{\left(x^2+a^2\right)\left(x^2+b^2\right)}\,dx =$

A. $\dfrac{1}{b^2+a^2}\left[\dfrac{1}{2}\tan^{-1}\dfrac{x}{a} - \dfrac{1}{b}\tan^{-1}\dfrac{x}{b}\right] + c$

B. $\dfrac{1}{b^2-a^2}\left[\dfrac{1}{a}\tan^{-1}\dfrac{x}{a} + \dfrac{1}{b}\tan^{-1}\dfrac{x}{b}\right] + c$

C. $\dfrac{1}{b^2-a^2}\left[\dfrac{1}{a}\tan^{-1}\dfrac{x}{a} - \dfrac{1}{b}\tan^{-1}\dfrac{x}{b}\right] + c$

D. none

Answer: B

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12. $\int \dfrac{x^2 - 1}{\left(x^2 + 1\right)\left(x^2 + 2\right)\left(x^2 + 3\right)} dx =$

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

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

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

D. none

Answer: A

13. $\int \dfrac{1}{a^4 - x^4} dx =$

A. $\dfrac{1}{4a^3}\left[\log\left|\dfrac{a+x}{a-x}\right| + 2\tan^{-1}\dfrac{x}{a}\right] + c$

B. $\dfrac{1}{2a^3}\left[\log\left|\dfrac{a+x}{a-x}\right| + 2\tan^{-1}\dfrac{x}{a}\right] + c$

C. $\dfrac{1}{4a^3}\left[\log\left|\dfrac{a-x}{a+x}\right| - 2\tan^{-1}\dfrac{x}{a}\right] + c$

D. none

Answer: A

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14. $\int \dfrac{e^x}{\left(e^x + 2\right)\left(e^x - 1\right)} dx =$

A. $\dfrac{1}{3}\log\left|\dfrac{e^x - 1}{e^x + 1}\right| + c$

B. $\dfrac{1}{3}\log\left|\dfrac{e^x - 1}{e^x + 2}\right| + c$

C. $\frac{1}{3}\log\left|\dfrac{e^x + 1}{e^x + 2}\right| + c$

D. none

Answer: B

15. $\displaystyle\int \frac{e^x}{e^{2x} + 2e^x + 5} dx =$

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

B. $\dfrac{1}{2}\tan^{-1}\left(\dfrac{e^x + 1}{2}\right) + c$

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

D. none

Answer: B

16. $\int \dfrac{1}{e^x + 2e^{-x} - 3} dx =$

A. $\log \left| \dfrac{e^x + 2}{e^x + 1} \right| + c$

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

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

D. none

Answer: C

17. $\int \dfrac{dx}{x(\log x - 2)(\log x - 3)} = I + c \Rightarrow I =$

A. $\dfrac{1}{x} \log \left| \dfrac{\log x - 3}{\log x - 2} \right|$

B. $\log \left| \dfrac{\log x - 3}{\log x - 2} \right|$

C. $\log \left| \dfrac{\log x - 2}{\log x - 3} \right|$

D. $\log \left| (\log(x - 3)(\log x - 2) \right|$

Answer: B

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18. $\displaystyle\int \dfrac{\sin x}{\cos x(1 + \cos x)} \, dx = f(x) + c \Rightarrow f(x) =$

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

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

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

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

Answer: A

19. $\int \dfrac{x^2}{x^6 + 2x^3 + 2} dx =$

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

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

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

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

Answer: D

20. $\int \dfrac{\cos x}{2\sin^2 x - 3\sin x + 4} dx =$

A. $\dfrac{2}{\sqrt{23}}\tan^{-1}\left(\dfrac{4\sin x - 3}{\sqrt{23}}\right) + c$

B. $\dfrac{2}{\sqrt{23}} \tan^{-1}\left(\dfrac{4\sin x + 3}{\sqrt{23}} \right) + c$

C. $\dfrac{2}{\sqrt{24}} \tan^{-1}\left(\dfrac{4\sin x - 3}{\sqrt{24}} \right) + c$

D. none

Answer: A

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21. $\displaystyle\int \dfrac{\cot x}{1 + \sin^2 x}\, dx =$

A. $\log\left| \dfrac{\sin x}{\sqrt{1 + \sin^2 x}} \right| + c$

B. $\log\left| \dfrac{\cos x}{\sqrt{1 + \sin^2 x}} \right| + c$

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

D. none

Answer: A

22. $\int \dfrac{\tan x}{1 + \cos x} dx =$

A. $-\log \left| \dfrac{\cos x}{1 + \cos x} \right| + c$

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

C. $\log \left| \dfrac{1 - \cos x}{\cos x} \right| + c$

D. none

Answer: B

23. $\int \dfrac{\tan x}{1 + \cos x} dx =$

A. 4

B. 3

C. 2

D. 1

Answer: C

24. If $\int \dfrac{x^2 - a^2}{x^2 + a^2} dx = x + k\tan^{-1}\dfrac{x}{a} + c$ then k=

A. $2a^2$

B. a^2

C. $-2a$

D. $2a$

Answer: c

25. $\int \dfrac{dx}{x\sqrt{1 - x^3}} =$

A. $\dfrac{1}{3}\log\left[\dfrac{\sqrt{1 - x^3} - 1}{\sqrt{1 - x^3} + 1}\right] + c$

B. $\dfrac{2}{3}\log\left[\dfrac{\sqrt{1 - x^3} - 1}{\sqrt{1 - x^3} + 1}\right] + c$

C. $\dfrac{2}{3}\log\left|1 - x^3\right|c$

D. $\dfrac{2}{3}\log\left(\dfrac{1}{\sqrt{1 - x^3}}\right) + c$

Answer: A

26. If $\int \dfrac{2x^2 + a^2}{x^2\left(x^2 + a^2\right)}dx = \dfrac{k}{x} + \dfrac{1}{a}\tan^{-1}\dfrac{x}{a} + c$ Then k=

A. 0

B. -1

C. 1

D. $1/a$

Answer: B

27. $\displaystyle\int \frac{1}{\left(e^x - 1\right)^2} dx =$

A. $\log\left(\dfrac{e^x}{e^x - 1}\right) - \dfrac{1}{e^x - 1} + c$

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

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

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

Answer: A

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28. Evaluate the integerals.

$$\int \dfrac{dx}{e^x + e^{2x}}$$

A. $\log\left(e^x + 1\right) - e^x + c$

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

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

D. none

Answer: B

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29. $\int \dfrac{\cos x + x\sin x}{x(x - \cos x)} dx =$

A. $\log|x(x - \cos x)| + c$

B. $\log\left|\left(1 - \dfrac{\cos(x)}{x}\right)\right| + c$

C. $\log\left|\dfrac{x}{x - \cos x}\right| + c$

D. none

Answer: B

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30. $\int \dfrac{1}{\sin^2 x + \sin 2x} dx =$

A. $\log\left|\dfrac{\tan x}{\tan x + 2}\right| + c$

B. $\dfrac{1}{2}\log\left|\dfrac{\tan x}{\tan x + 2}\right| + c$

C. $2\log\left|\dfrac{\tan x + 2}{\tan x}\right| + c$

D. none

Answer: B

31. $\int \dfrac{\sin x \cos^3 x}{1 + \cos^2 x} dx =$

A. $\dfrac{-1}{2}\left(\cos^2 x\right) + \dfrac{1}{2}\log\left(1 + \cos^2 x\right) + c$

B. $\dfrac{1}{2}\left(1 + \cos^2 x\right) - \dfrac{1}{2}\log\left(1 + \cos^2 x\right) + c$

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

D. $\dfrac{-1}{2}\left(1 + \cos^2 x\right) - \dfrac{1}{2}\log\left(1 + \cos^2 x\right) + c$

Answer: A

32. $\int \dfrac{1}{\sqrt{9x^2 - 25}}\, dx =$

A. $\dfrac{1}{2}\cosh^{-1}\left(\dfrac{5x}{3}\right) + c$

B. $\dfrac{1}{3}\cosh^{-1}\left(\dfrac{3x}{5}\right) + c$

C. $\dfrac{1}{2}\cosh^{-1}\left(\dfrac{3x}{5}\right) + c$

D. none

Answer: B

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33. $\int \dfrac{1}{\sqrt{4 - 9x^2}}\, dx =$

A. $\dfrac{1}{2}\sin^{-1}\left(\dfrac{3x}{2}\right) + c$

B. $\dfrac{1}{3}Cash^{-1}\left(\dfrac{3x}{5}\right) + c$

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

D. $\dfrac{2}{3} \sin^{-1}\left(\dfrac{3x}{2}\right) + c$

Answer: C

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34. $\displaystyle\int \dfrac{1}{\sqrt{x^2 - 4x - 5}}\, dx =$

A. $\cosh^{-1}\left(\dfrac{x + 2}{3}\right) + c$

B. $\sinh^{-1}\left(\dfrac{x - 2}{3}\right) + c$

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

D. none

Answer: C

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35. $\int \dfrac{1}{\sqrt{2x^2 + 3x + 4}} dx=$

A. $\dfrac{1}{\sqrt{2}} \sinh^{-1}\left(\dfrac{4x - 3}{\sqrt{23}}\right) + c$

B. $\dfrac{1}{\sqrt{2}} \sinh^{-1}\left(\dfrac{4x + 3}{\sqrt{23}}\right) + c$

C. $\dfrac{1}{\sqrt{2}} \cosh^{-1}\left(\dfrac{4x + 3}{\sqrt{23}}\right) + c$

D. none

Answer: B

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36. $\int \dfrac{1}{\sqrt{3 - x^2 + 2x}} dx=$

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

B. $\cosh^{-1}\left(\dfrac{x-1}{2}\right) + c$

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

D. $\sinh^{-1}\left(\dfrac{x-1}{2}\right) + c$

Answer: A

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37. $\displaystyle\int \dfrac{dx}{\sqrt{x - x^2}} =$

A. $2\sin^{-1}\sqrt{x} + c$

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

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

D. $\sin^{-1}\sqrt{x} + c$

Answer: A

38. $\int \dfrac{1}{\sqrt{5x - 6 - x^2}} dx =$

A. $\sin^{-1}(2x + 5) + c$

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

C. $\cosh^{-1}(2x + 5) + c$

D. none

Answer: B

39. $\int \dfrac{2x + 5}{\sqrt{x^2 + 4x - 5}} dx =$

A. $2\sqrt{x^2 + 4x - 5} - \cosh^{-1}\left(\dfrac{x + 2}{3}\right) + c$

B. $2\sqrt{x^2 + 4x - 5} + \cosh^{-1}\left(\dfrac{x + 2}{3}\right) + c$

C. $2\sqrt{x^2 + 4x + 5} + \cos^{-1}\left(\dfrac{x + 2}{3}\right) + c$

D. $2\sqrt{x^2 + 4x - 5} + \cos^{-1}\left(\dfrac{x - 2}{3}\right) + c$

Answer: B

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40. $\displaystyle\int \dfrac{2x + 2}{\sqrt{x^2 - 4x - 5}}\,dx =$

A. $\sqrt{x^2 - 4x - 5} + \log\left|x + \sqrt{x^2 - 4x - 5}\right| + c$

B. $\log\left|\sqrt{x^2 - 4x - 5}\right| + \sqrt{x^2 - 4x - 5} + c$

C. $\sqrt{x^2 - 4x - 5} + 6\log \mid (x - 2) + \sqrt{x^2 - 4x - 5} + c$

D. $2\sqrt{x^2 - 4x - 5} + 6\log\left|(x - 2) + \sqrt{x^2 - 4x - 5}\right| + c$

Answer: D

41. $\int \dfrac{2x - 1}{\sqrt{1 - 5x - 6x^2}} dx =$

A. $-\dfrac{1}{3}\sqrt{1 + 5x + 6x^2} - \dfrac{11}{6\sqrt{6}}\sin^{-1}\left(\dfrac{12x - 5}{7}\right) + c$

B. $-\dfrac{1}{3}\sqrt{1 - 5x - 6x^2} - \dfrac{11}{6\sqrt{6}}\sin^{-1}\left(\dfrac{12x - 5}{7}\right) + c$

C. $-\dfrac{1}{3}\sqrt{1 - 5x - 6x^2} - \dfrac{11}{6\sqrt{6}}\sin^{-1}\left(\dfrac{12x + 5}{7}\right) + c$

D. none

Answer: B

42. $\int \dfrac{3x - 4}{\sqrt{2x^2 + 4x + 5}} dx =$

A. $\dfrac{3}{2}\sqrt{2x^2 + 4x + 5} + \dfrac{7}{\sqrt{2}}\sinh^{-1}\left(\dfrac{\sqrt{2}(x + 1)}{\sqrt{3}}\right) - c$

B. $\dfrac{3}{2}\sqrt{2x^2 - 4x - 5} + \dfrac{7}{\sqrt{2}}\sinh^{-1}\left(\dfrac{\sqrt{2}(x + 1)}{\sqrt{3}}\right) - c$

C. $\dfrac{3}{2}\sqrt{2x^2 + 4x + 5} - \dfrac{7}{\sqrt{2}}\sinh^{-1}\left(\dfrac{\sqrt{2}(x - 1)}{\sqrt{3}}\right) - c$

D. $\dfrac{3}{2}\sqrt{2x^2 + 4x + 5} - \dfrac{7}{\sqrt{2}}\sinh^{-1}\left(\dfrac{\sqrt{2}(x + 1)}{\sqrt{3}}\right) - c$

Answer: D

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43. $\displaystyle\int \dfrac{e^x}{\sqrt{e^{2x} - 3e^x + 5}}\,dx =$

A. $\sinh^{-1}\left(\dfrac{2e^x - 3}{\sqrt{11}}\right) + c$

B. $\sinh^{-1}\left(\dfrac{e^x - 3}{\sqrt{1}}\right) + c$

C. $\sinh^{-1}\left(\dfrac{2e^x + 3}{\sqrt{1}}\right) + c$

D. none

Answer: A

44. $\int \dfrac{\sec^2 x}{\sqrt{\tan^2 x - 2\tan x + 5}} dx =$

A. $\sinh^{-1}\left(\dfrac{\tan x - 1}{3}\right) + c$

B. $\sinh^{-1}\left(\dfrac{\tan x - 1}{2}\right) + c$

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

D. none

Answer: B

45. $\int \dfrac{x^3}{\sqrt{a^8 - x^8}}\, dx =$

A. $-\dfrac{1}{4}\sin^{-1}\left(\dfrac{x^4}{a^4}\right) + c$

B. $\dfrac{1}{2}\sin^{-1}\left(\dfrac{x^4}{a^4}\right) + c$

C. $\dfrac{1}{4}\sin^{-1}\left(\dfrac{x^4}{a^4}\right) + c$

D. none

Answer: C

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46. Evaluate the integerals.

$\int\sqrt{\dfrac{5 - x}{x - 2}}\, dxon(2, 5)$

A. $\sqrt{7x - x^2 - 10} - \dfrac{3}{2}\sin^{-1}\left(\dfrac{2x + 7}{3}\right) + c$

B. $\sqrt{7x + x^2 - 10} - \dfrac{3}{2}\sin^{-1}\left(\dfrac{2x - 7}{3}\right) + c$

C. $\sqrt{7x - x^2 - 10} + \dfrac{3}{2}\sin^{-1}\left(\dfrac{2x - 7}{3}\right) + c$

D. $\sqrt{7x - x^2 - 10} + \dfrac{3}{2}\sin^{-1}\left(\dfrac{2x + 7}{3}\right) + c$

Answer: C

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47. $\int\left[\sqrt{\dfrac{1 + x}{1 - x}}\right]dx =$

A. $\sin^{-1}x + \sqrt{1 + x^2} + c$

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

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

D. $\sin^{-1}x - \sqrt{1 - x^2} + c$

Answer: D

48. $\int\left(\sqrt{\dfrac{2 + x}{2 - x}}\right)dx =$

A. $2\sin^{-1}\left(\dfrac{x}{2}\right) + \sqrt{4 - x^2} + c$

B. $2\cos^{-1}\left(\dfrac{x}{2}\right) - \sqrt{4 - x^2} + c$

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

D. $2\sin^{-1}\left(\dfrac{x}{2}\right) - \sqrt{4 - x^2} + c$

Answer: D

49. If $\int\dfrac{2^x}{\sqrt{1 - 4^x}}dx = K\sin^{-1}\left(2^x\right) + c$, then K=

A. $\log 2$

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

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

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

Answer: D

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50. $\displaystyle\int \dfrac{1}{2x^2 - 3}\,dx =$

A. $\dfrac{1}{\sqrt{6}}\log\left|\dfrac{\sqrt{2}x - \sqrt{3}}{\sqrt{2}x + \sqrt{3}}\right| + c$

B. $\dfrac{1}{2\sqrt{3}}\log\left|\dfrac{\sqrt{2}x - \sqrt{3}}{\sqrt{2}x + \sqrt{3}}\right| + c$

C. $\dfrac{1}{2\sqrt{6}}\log\left|\dfrac{\sqrt{2}x + \sqrt{3}}{\sqrt{2}x + \sqrt{3}}\right| + c$

D. none

Answer: B

51. $\int \dfrac{1}{9x^2 + 16} dx =$

A. $\tan^{-1}\left(\dfrac{3x}{4}\right) + c$

B. $\dfrac{1}{12}\tan^{-1}\left(\dfrac{3x}{4}\right) + c$

C. $\dfrac{1}{2}\tan^{-1}\left(\dfrac{3x}{4}\right) + c$

D. none

Answer: B

52. $\int \dfrac{e^{2x}}{\sqrt{e^x + 1}} dx =$

A. $\dfrac{4}{7}\left(e^x - 1\right)^{7/4} - \dfrac{4}{3}\left(e^x - 1\right)^{3/4} + c$

B. $\dfrac{4}{7}\left(e^x + 1\right)^{7/4} + \dfrac{4}{3}\left(e^x + 1\right)^{3/4} + c$

C. $\dfrac{4}{7}\left(e^x + 1\right)^{7/4} - \dfrac{2}{3}\left(e^x + 1\right)^{3/4} + c$

D. $\dfrac{4}{7}\left(e^x + 1\right)^{7/4} - \dfrac{4}{3}\left(e^x + 1\right)^{3/4} + c$

Answer: D

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53. $\displaystyle\int \left(\dfrac{1}{x^2 + 6x + 10}\right) dx =$

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

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

C. $\sinh^{-1}(x - 3) + c$

D. none

Answer: A

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54. $\int \dfrac{dx}{x^2 + 2x + 2} = f(x) + c \Rightarrow f(x) =$

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

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

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

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

Answer: A

55. $\int \dfrac{1}{2x^2 + 3x - 5}dx =$

A. $\dfrac{1}{5}\log\left|\dfrac{2x - 2}{2x + 5}\right| + c$

B. $\dfrac{1}{7}\log\left|\dfrac{2x - 2}{2x + 5}\right| + c$

C. $\dfrac{1}{7}\log\left|\dfrac{2x-2}{2x-5}\right| + c$

D. none

Answer: B

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56. $\displaystyle\int \dfrac{1}{6x - 7 - x^2} dx =$

A. $\dfrac{1}{\sqrt{2}}\log\left|\dfrac{\sqrt{2}+x-3}{\sqrt{2}-x+3}\right| + c$

B. $\dfrac{1}{2\sqrt{2}}\log\left|\dfrac{\sqrt{2}+x+3}{\sqrt{2}-x+3}\right| + c$

C. $\dfrac{1}{2\sqrt{2}}\log\left|\dfrac{\sqrt{2}+x-3}{\sqrt{2}-x+3}\right| + c$

D. $\dfrac{1}{\sqrt{2}}\log\left|\dfrac{\sqrt{2}+x+3}{\sqrt{2}-x+3}\right| + c$

Answer: C

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57. $\int \dfrac{3x + 4}{x^2 + 2x + 3} dx =$

A. $\dfrac{3}{2}\log\left|x^2 + 2x + 3\right| + \dfrac{1}{\sqrt{2}}\tan^{-1}\left(\dfrac{x + 1}{\sqrt{2}}\right) + c$

B. $\dfrac{3}{2}\log\left|x^2 - 2x - 3\right| + \dfrac{1}{\sqrt{2}}\tan^{-1}\left(\dfrac{x + 1}{\sqrt{2}}\right) + c$

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

D. none

Answer: A

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58. If $\int \dfrac{x + 5}{x^2 + 4x + 5} dx = a\log\left(x^2 + 4x + 5\right) + b\tan^{-1}(x + k)$ constant

then (a,b,k)=

A. $\left(\dfrac{1}{2}, 3, 2\right)$

B. $\left(\dfrac{1}{2}1, 2\right)$

C. $\left(\dfrac{1}{2}3, 1\right)$

D. $(1, 3, 2)$

Answer: A

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59. Evaluate the integerals.

$$\int \sqrt{e^x - 4}\,dxon\left[\log_e 4, \infty\right].$$

A. $\tan^{-1}\left(\dfrac{\sqrt{e^x - 4}}{2}\right) + \sqrt{e^x - 4} + c$

B. $2\sqrt{e^x - 4} - 4\tan^{-1}\left(\dfrac{\sqrt{e^x - 4}}{2}\right) + c$

C. $2\sqrt{e^x - 4} - 4\cos^{-1}\left(\dfrac{\sqrt{e^x - 4}}{2}\right) + c$

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

Answer: B

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60. $\displaystyle\int \dfrac{x + 4}{6x - 7 - x^2}\,dx =$

A. $\dfrac{1}{2}\log\left|6x - 7 - x^2\right| - \dfrac{7}{2\sqrt{2}}\log\left|\dfrac{x + 3 - \sqrt{2}}{x - 3 + \sqrt{2}}\right| + c$

B. $-\dfrac{1}{2}\log\left|6x + 7 + x^2\right| + \dfrac{7}{2\sqrt{2}}\log\left|\dfrac{x - 3 - \sqrt{2}}{x - 3 + \sqrt{2}}\right| + c$

C. $-\dfrac{1}{2}\log\left|6x - 7 - x^2\right| - \dfrac{7}{2\sqrt{2}}\log\left|\dfrac{x - 3 - \sqrt{2}}{x - 3 + \sqrt{2}}\right| + c$

D. none

Answer: C

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61. $\int \sqrt{x^2 + 4} dx =$

A. $\dfrac{x}{2}\sqrt{x^2 + 4} + 2\sinh^{-1}\left(\dfrac{x}{2}\right) + c$

B. $\dfrac{x}{2}\sqrt{x^2 + 4} + 2\sinh^{-1}\left(\dfrac{x}{4}\right) + c$

C. $\dfrac{x}{2}\sqrt{x^2 + 4} - 2\sinh^{-1}\left(\dfrac{x}{2}\right) + c$

D. $\dfrac{x}{2}\sqrt{x^2 + 4} - 2\sinh^{-1}\left(\dfrac{x}{2}\right) + c$

Answer: A

62. $\int \sqrt{4 - x^2} dx =$

A. $\dfrac{x}{2}\sqrt{4 - x^2} - \sin^{-1}\left(\dfrac{x}{2}\right) + c$

B. $\dfrac{x}{3}\sqrt{4 + x^2} + \sin^{-1}\left(\dfrac{x}{2}\right) - c$

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

D. none

Answer: C

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63. $\int \sqrt{x^2 - 25}\, dx =$

A. $\dfrac{x}{2}\sqrt{x^2 - 25} - \dfrac{25}{2}\cosh^{-1}\left(\dfrac{x}{5}\right) + c$

B. $\dfrac{x}{2}\sqrt{x^2 + 25} + \dfrac{25}{2}\sinh^{-1}\left(\dfrac{x}{5}\right) + c$

C. $\dfrac{x}{3}\sqrt{x^2 - 25} + \dfrac{25}{2}\cosh^{-1}\left(\dfrac{x}{3}\right) + c$

D. none

Answer: A

64. $\int \sqrt{1 + x - 2x^2} dx =$

A. $\dfrac{(4x + 1)}{8}\sqrt{1 + x - 2x^2} + \dfrac{9}{16\sqrt{2}}\sin^{-1}\left(\dfrac{4x + 1}{3}\right) + c$

B. $\dfrac{(4x - 1)}{8}\sqrt{1 + x - 2x^2} + \dfrac{9}{16\sqrt{2}}\sin^{-1}\left(\dfrac{4x - 1}{3}\right) + c$

C. $\dfrac{(4x - 1)}{8}\sqrt{1 + x + 2x^2} - \dfrac{9}{6\sqrt{2}}\sin^{-1}\left(\dfrac{4x - 1}{3}\right) + c$

D. none

Answer: B

65. $\int \sqrt{2x^2 + 3x + 4} dx =$

A. $\dfrac{(4x - 3)}{8}\sqrt{2x^2 - 3x - 4} + \dfrac{23}{16\sqrt{2}}\sinh^{-1}\left(\dfrac{4x + 3}{\sqrt{23}}\right) + c$

B. $\dfrac{(4x - 3)}{8}\sqrt{2x^2 + 3x + 4} + \dfrac{23}{6\sqrt{2}}\sinh^{-1}\left(\dfrac{4x - 3}{\sqrt{23}}\right) + c$

C. $\dfrac{(4x + 3)}{8}\sqrt{2x^2 + 3x + 4} + \dfrac{23}{16\sqrt{2}}\sinh^{-1}\left(\dfrac{4x + 3}{\sqrt{23}}\right) + c$

D.

Answer: C

66. $\displaystyle\int \dfrac{1}{x + \sqrt{x^2 + 1}} = dx$

A. $\dfrac{x}{2}\sqrt{x^2 + 1} + \dfrac{1}{2}\sinh^{-1}x - \dfrac{x^2}{2} + c$

B. $\dfrac{x}{2}\sqrt{x^2 + 1} - \dfrac{1}{2}\sinh^{-1}x - \dfrac{x^2}{2} + c$

C. $\dfrac{x}{2}\sqrt{x^2 - 1} + \dfrac{1}{2}\sinh^{-1}x - \dfrac{x^2}{2} + c$

D. none

Answer: A

67. $\int (3x + 2)\sqrt{\left(x^2 + 2x + 5\right)}dx =$

A. $\left(x^2 + 2x + 5\right)^{3/2} - \dfrac{(x - 1)}{2}\sqrt{x^2 + 2x + 5} - 2\sinh^{-1}\left(\dfrac{x + 1}{2}\right) + c$

B. $\left(x^2 + 2x + 5\right)^{3/2} - \dfrac{(x - 1)}{2}\sqrt{x^2 + 2x + 5} - 2\sinh^{-1}\left(\dfrac{x + 1}{2}\right) + c$

C. $\left(x^2 - 2x + 5\right)^{3/2} - \dfrac{(x - 1)}{2}\sqrt{x^2 + 2x + 5} - 2\sinh^{-1}\left(\dfrac{x + 1}{2}\right) + c$

D. $\left(x^2 + 2x + 5\right)^{3/2} - \dfrac{(x - 1)}{2}\sqrt{x^2 - 2x - 5} - 2\sinh^{-1}\left(\dfrac{x + 1}{2}\right) + c$

Answer: B

68. $\int (2 - 3x)\sqrt{x^2 - 4x - 5}dx =$

A. $\left(x^2 + 4x + 5\right)^{3/2} + 2(x - 2)\sqrt{x^2 - 4x - 5} - 18\cosh^{-1}\left(\dfrac{x - 2}{3}\right) + c$

B. $-\left(x^2 - 4x - 5\right)^{3/2} - 2(x - 2)\sqrt{x^2 - 4x - 5} + 18\cosh^{-1}\left(\dfrac{x - 2}{3}\right) + c$

C. $-\left(x^2 - 4x - 5\right)^{3/2} + 2(x + 2)\sqrt{x^2 + 4x + 5} + 18\cosh^{-1}\left(\dfrac{x - 2}{3}\right) + c$

D. none

Answer: B

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69. $\displaystyle \int \dfrac{dx}{(x - 1)\sqrt{x^2 - 1}} =$

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

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

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

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

Answer: C

70. $\int \dfrac{1}{(x + 1)\sqrt{x^2 + x + 2}} dx =$

A. $\dfrac{1}{\sqrt{2}}\cosh^{-1}\left(\dfrac{3 - x}{\sqrt{7}(x + 1)} \right) + c$

B. $-\dfrac{1}{\sqrt{2}}\cosh^{-1}\left(\dfrac{3 - x}{\sqrt{7}(x + 1)} \right) + c$

C. $-\dfrac{1}{\sqrt{2}}\cosh^{-1}\left(\dfrac{3 + x}{\sqrt{7}(x - 1)} \right) + c$

D. $-\dfrac{1}{\sqrt{2}}\cosh^{-1}\left(\dfrac{3 - x}{\sqrt{7}(x - 1)} \right) + c$

Answer: B

71. $\int \dfrac{1}{(2x + 1)\sqrt{x^2 - x - 2}} dx =$

A. $-\dfrac{1}{\sqrt{5}}\sin^{-1}\left(\dfrac{4x+7}{6x+3}\right)+c$

B. $-\dfrac{1}{\sqrt{3}}\sin^{-1}\left(\dfrac{4x+7}{6x+3}\right)+c$

C. $-\dfrac{1}{\sqrt{5}}\sin^{-1}\left(\dfrac{4x-7}{6x-3}\right)+c$

D. none

Answer: A

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72. $\displaystyle\int\dfrac{1}{x^2\sqrt{1+x^2}}\,dx =$

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

B. $\dfrac{\sqrt{1+x^2}}{x}+c$

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

D. none

Answer: A

73. $\int \dfrac{1}{\left(x^2 + 9\right)\sqrt{x^2 - 9}} dx =$

A. $\dfrac{1}{8\sqrt{2}}\log\left|\dfrac{\sqrt{2} - x - \sqrt{x^2 - 9}}{\sqrt{2}x - \sqrt{x^2 - 9}}\right| + c$

B. $\dfrac{1}{18\sqrt{2}}\log\left|\dfrac{\sqrt{2} + x - \sqrt{x^2 - 9}}{\sqrt{2}x - \sqrt{x^2 - 9}}\right| + c$

C. $\dfrac{1}{18\sqrt{2}}\log\left|\dfrac{\sqrt{2} + x - \sqrt{x^2 + 9}}{\sqrt{2}x - \sqrt{x^2 - 9}}\right| - c$

D. none

Answer: B

74. $\int \dfrac{1}{\left(1 + x^2\right)\sqrt{1 - x^2}}\, dx =$

A. $-\dfrac{1}{\sqrt{2}}\tanh^{-1}\left(\dfrac{\sqrt{1 + x^2}}{\sqrt{2}x}\right) + c$

B. $\dfrac{1}{\sqrt{2}}\tanh^{-1}\left(\dfrac{\sqrt{1 + x^2}}{\sqrt{2}x}\right) + c$

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

D. none

Answer: C

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75. $\int \dfrac{2x + 3}{\sqrt{3 - x}}\, dx =$

A. $-18\sqrt{3 - x} - \dfrac{4}{3}(3 - x)^{3/2} + c$

B. $-18\sqrt{3 - x} + \dfrac{4}{3}(3 - x)^{3/2} + c$

C. $18\sqrt{3 - x} - \dfrac{4}{3}(3 + x)^{3/2} + c$

D. $-18\sqrt{3 + x} + \dfrac{4}{3}(3 - x)^{3/2} + c$

Answer: B

76. $\displaystyle\int \dfrac{2x + 3}{\sqrt{4x + 3}}dx =$

A. $\dfrac{1}{12}(4x - 3)^{3/2} + \dfrac{1}{4}\sqrt{4x + 3} + c$

B. $\dfrac{1}{12}(4x + 3)^{3/2} + \dfrac{3}{4}\sqrt{4x + 3} + c$

C. $\dfrac{1}{12}(4x + 3)^{3/2} + \dfrac{3}{4}\sqrt{4x + 3}^{3/2} + c$

D. none

Answer: B

77. Evalute the following integrals

$$\int (x + 2)\sqrt{x + 1} \, dx$$

A. $\dfrac{2}{5}(x - 1)^{3/2}(3x + 8) + c$

B. $\dfrac{2}{15}(x - 1)^{3/2}(3x - 8) + c$

C. $\dfrac{2}{15}(x + 1)^{3/2}(3x + 8) + c$

D. $\dfrac{2}{15}(x - 1)^{3/2}(3x + 8) + c$

Answer: C

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78. $\int (2x + 3)\sqrt{2 - 3x} \, dx =$

A. $-\dfrac{1}{135}(2 - 3x)^{3/2}(36x - 106) + c$

B. $\dfrac{1}{35}(2 + 3x)^{3/2}(36x - 106) + c$

C. $-\dfrac{1}{135}(2 + 3x)^{3/2}(36x - 106) + c$

D. $-\dfrac{1}{135}(2 - 3x)^{3/2}(36x - 106) + c$

Answer: D

79. If $\displaystyle\int \dfrac{dx}{\sqrt{x}(x + 9)} = f(x) + $ constant, then f(x)=

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

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

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

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

Answer: B

80. $\int \dfrac{1}{(x+2)\sqrt{x+1}} dx =$

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

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

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

D. none

Answer: A

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81. $\int \dfrac{dx}{(x+100)\sqrt{x+99}} = f(x) + c \Rightarrow f(x) =$

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

82. $\int \dfrac{dx}{(x+1)\sqrt{4x+3}} =$

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

83. $\int \dfrac{x^2-1}{x^4+1} dx =$

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

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

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

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

Answer: A

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84. $\displaystyle\int \dfrac{x^2}{x^4 + 1}\,dx =$

A. $\dfrac{1}{2\sqrt{2}}\tan^{-1}\left(\dfrac{x^2 + 1}{\sqrt{2}x}\right) + \dfrac{1}{4\sqrt{2}}\log\left|\dfrac{x^2 - \sqrt{2}x + 1}{x^2 + \sqrt{2}x + 1}\right| + c$

B. $\dfrac{1}{2\sqrt{2}}\tan^{-1}\left(\dfrac{x^2 1}{\sqrt{2}x}\right) + \dfrac{1}{4\sqrt{2}}\log\left|\dfrac{x^2 + \sqrt{2}x + 1}{x^2 - \sqrt{2}x + 1}\right| + c$

C. $\dfrac{1}{2\sqrt{2}}\tan^{-1}\left(\dfrac{x^2 1}{\sqrt{2}x}\right) + \dfrac{1}{4\sqrt{2}}\log\left|\dfrac{x^2 - \sqrt{2}x + 1}{x^2 + \sqrt{2}x + 1}\right| + c$

D. none

Answer: C

85. $\displaystyle\int \dfrac{x^2 + 1}{x^4 + x^2 + 1}dx =$

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

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

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

D. $\dfrac{1}{\sqrt{3}}\tan^{-1}\left(\dfrac{x^2 - 1}{\sqrt{3}x}\right) + c$

Answer: D

86. $\int \dfrac{1}{x^4 + 1}\, dx =$

A. $\dfrac{1}{2\sqrt{2}}\tan^{-1}\left(\dfrac{x^2 + 1}{\sqrt{2}x}\right) - \dfrac{1}{4\sqrt{2}}\log\log\left|\dfrac{x^2 + \sqrt{2}x + 1}{x^2 - \sqrt{2}x + 1}\right| + c$

B. $\dfrac{1}{2\sqrt{2}}\tan^{-1}\left(\dfrac{x^2 - 1}{\sqrt{2}x}\right) - \dfrac{1}{4\sqrt{2}}\log\left|\dfrac{x^2 + \sqrt{2}x + 1}{x^2 - \sqrt{2}x + 1}\right| + c$

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

D. none

Answer: B

87. $\int \dfrac{1}{\sqrt{1 + x^4}}\, dx =$

A. $\dfrac{1}{4}\log\left|\dfrac{x+\left(1+x^4\right)^{1/4}}{x-\left(1+x^4\right)^{1/4}}\right| - \dfrac{1}{4}\tan^{-1}\dfrac{\left(1+x^4\right)^{1/4}}{x} + c$

B. $\dfrac{1}{4}\log\left|\dfrac{x+\left(1+x^4\right)^{1/4}}{x+\left(1+x^4\right)^{1/4}}\right| + \dfrac{1}{4}\tan^{-1}\dfrac{\left(1+x^4\right)^{1/4}}{x} + c$

C. $\dfrac{1}{4}\log\left|\dfrac{x+\left(1+x^4\right)^{1/4}}{x+\left(1+x^4\right)^{1/4}}\right| - \dfrac{1}{2}\tan^{-1}\dfrac{\left(1+x^4\right)^{1/4}}{x} + c$

D. none

Answer: C

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88. $\displaystyle\int \dfrac{x^2+1}{x^4+x^2+1}dx =$

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

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

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

D. $\dfrac{1}{\sqrt{3}}\tan^{-1}\left(\dfrac{x^2 - 1}{\sqrt{3}x}\right) + c$

Answer: A

89. $\displaystyle\int \dfrac{7x^8 + 8x^7}{\left(1 + x + x^8\right)^2}\,dx = f(x) + c \Rightarrow f(x) =$

A. $\dfrac{x^8}{1 + x + x^8}$

B. $28\log\left(1 + x + x^8\right)$

C. $\dfrac{1}{1 + x + x^8}$

D. $\dfrac{-1}{1 + x + x^8}$

Answer: A

90. $\int \dfrac{\sqrt{x^2 + 1}\left[\log\left(x^2 + 1\right) - 2\log x\right]}{x^4} dx =$

A. $\dfrac{\left(x^2 + 1\right)^{3/2}}{9x^3}\left[2 + 3\log\left(1 + \dfrac{1}{x^2}\right)\right] + c$

B. $\dfrac{\left(x^2 + 1\right)^{3/2}}{9x^3}\left[1 - 2\log\left(1 + \dfrac{1}{x^2}\right)\right] + c$

C. $\dfrac{\left(x^2 + 1\right)^{3/2}}{9x^3}\left[2 - 3\log\left(1 + \dfrac{1}{x^2}\right)\right] + c$

D. $\dfrac{\left(x^2 + 1\right)^{3/2}}{9x^3}\left[2 + 3\log\left(1 - \dfrac{1}{x^2}\right)\right] + c$

Answer: C

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91. $\int \dfrac{x^2}{\sqrt{a^2 - x^2}} dx =$

A. $\dfrac{a^2}{2}\sin^{-1}\dfrac{x}{a} - \dfrac{x}{2}\sqrt{a^2 - x^2} + c$

B. $\dfrac{a^2}{2}\sin^{-1}\dfrac{x}{a} - \dfrac{x}{4}\sqrt{a^2 - x^2} + c$

C. $\dfrac{a^2}{2}\sin^{-1}\dfrac{x}{a} - \dfrac{x}{2}\sqrt{a^2 - x^2} + c$

D. $\dfrac{a^2}{2}\sin^{-1}\dfrac{x}{a} + \dfrac{x}{2}\sqrt{a^2 - x^2} + c$

Answer: A

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92. $\displaystyle\int \dfrac{1}{\left(9 - x^2\right)^{3/2}}\,dx =$

A. $\dfrac{1}{3}\dfrac{x}{\sqrt{9 - x^2}} + c$

B. $\dfrac{1}{9}\dfrac{x}{\sqrt{9 - x^2}} + c$

C. $\dfrac{1}{9}\dfrac{x}{\sqrt{9 + x^2}} + c$

D. none

Answer: B

93. $\int \dfrac{1}{\left(4 + x^2\right)^{5/2}} \, dx =$

A. $\dfrac{x}{16\sqrt{4 + x^2}} - \dfrac{x^2}{48\left(4 + x^2\right)^{3/2}} + c$

B. $\dfrac{x}{16\sqrt{4 + x^2}} - \dfrac{x^3}{48\left(4 + x^2\right)^{3/2}} + c$

C. $\dfrac{x}{16\sqrt{4 + x^2}} + \dfrac{x^3}{48\left(4 + x^2\right)^{3/2}} + c$

D. $\dfrac{x}{16\sqrt{4 + x^2}} - \dfrac{x^3}{48\left(4 - x^2\right)^{3/2}} + c$

Answer: A

94. $\int \dfrac{x^2}{\left(1 + x^2\right)^{3/2}} \, dx =$

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

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

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

D. none

Answer: C

95. $\int \dfrac{x^3}{\sqrt{1 + x^2}} \, dx =$

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

B. $x\sqrt{1 + x^2} + \dfrac{2}{3}\left(1 + x^2\right)^{3/2} + c$

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

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

Answer: C

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96. $\displaystyle\int \dfrac{x^3 + 1}{\sqrt{1 - x^2}}dx =$

A. $\dfrac{1}{3}\left[\left(1 - x^2\right)^{3/2} - 3\sinh^{-1}x\right] + c$

B. $\dfrac{1}{3}\left[\left(1 - x^2\right)^{3/2} + 3\sinh^{-1}x\right] + c$

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

D. $\dfrac{1}{3}\left[\left(1 - x^2\right)^{3/2} - 3\sqrt{1 - x^2}\right) - 3\sin^{-1}x\right] + c$

Answer: D

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97. $\int \dfrac{x}{\left(x^2 + 2x + 2\right)^2} dx =$

A. $\dfrac{x^2 + 2}{x^2 + 2x + 2} - \dfrac{1}{2}\tan^{-1}(x + 1) + c$

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

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

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

Answer: C

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98. Evaluate: $\int \sqrt{\sec x - 1}\, dx$

A. $2\cosh^{-1}\left[\sqrt{2}\cos(x/2)\right] + c$

B. $-2\cosh^{-1}\big]\big[\sqrt{2}\cos(x/3)\big] + c$

C. $-2\cosh^{-1}\big[\sqrt{2}\cos(x/2)\big] + c$

D. none

Answer: C

99. $\int\left(\sqrt{\sin x} + \sqrt{\cos x}\right)^{-4} dx =$

A. $\dfrac{2}{\left(\sqrt{\tan x} + 1\right)^2}\left[\dfrac{1}{3\left(\sqrt{\tan x} + 1\right)} - \dfrac{1}{2}\right] + c$

B. $\dfrac{2}{\left(\sqrt{\tan x} + 1\right)^2}\left[\dfrac{1}{3\left(\sqrt{\tan x} + 1\right)} + \dfrac{1}{2}\right] + c$

C. $\dfrac{1}{\left(\sqrt{\tan x} + 1\right)^2}\left[\dfrac{1}{3\left(\sqrt{\tan x} + 1\right)} + \dfrac{1}{2}\right] + c$

D. none

Answer: A

100. $\int x^2 \sqrt{x^6 - 1}\, dx =$

A. $\dfrac{x}{6}\sqrt{x^6 - 1} + \dfrac{1}{6}\cosh^{-1} x^3 + c$

B. $\dfrac{1}{6}\left(x^3\sqrt{x^6 - 1} + \dfrac{1}{6}\cosh^{-1} x^3\right) + c$

C. $-\dfrac{1}{6}\cosh^{-1} x^3 + c$

D. $\dfrac{1}{6}\left(x^3\sqrt{x^6 - 1} - \cos^{-1} x^3\right) + c$

Answer: B

101. $\int \dfrac{1}{3 + 4\cos x}\, dx =$

A. $\dfrac{1}{\sqrt{7}}\log\left[\dfrac{\sqrt{7} - \tan(x/2)}{\sqrt{7} + \tan(x/2)}\right] + c$

B. $\log\left[\dfrac{\sqrt{7} + \tan(x/2)}{\sqrt{7} - \tan(x/2)}\right] + c$

C. $\dfrac{1}{\sqrt{7}}\log\left[\dfrac{\sqrt{7} + \tan(x/2)}{\sqrt{7} - \tan(x/2)}\right] + c$

D. none

Answer: C

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102. Evaluate the integerals.

$$\int\dfrac{dx}{4 + 5\sin x}$$

A. $\dfrac{1}{3}\log\left|\dfrac{2\tan x/2 + 1}{\tan x/2 + 2}\right| + c$

B. $\dfrac{1}{6}\log\left|\dfrac{2\tan x/2 + 1}{\tan x/2 + 4}\right| + c$

C. $\dfrac{1}{3}\log\left|\dfrac{2\tan x/2 - 1}{\tan x/2 - 4}\right| + c$

D. $\dfrac{1}{3}\log\left|\dfrac{2\cos x/2 + 1}{\tan x/2 + 4}\right| + c$

Answer: A

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103. $\int \dfrac{dx}{4\cos x + 3\sin x}$

A. $\dfrac{1}{5}\log\left|\dfrac{1 + 2\tan x/2}{4 - 2\tan x/2}\right| + c$

B. $\dfrac{2}{5}\log\left|\dfrac{1 + 2\tan x/2}{4 - 2\tan x/2}\right| + c$

C. $\dfrac{1}{5}\log\left|\dfrac{1 - 2\tan x/2}{4 - 2\tan x/2}\right| + c$

D. $\dfrac{1}{3}\log\left|\dfrac{1 + 2\tan x/2}{4 - 2\tan x/2}\right| + c$

Answer: A

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104. $\int \dfrac{1}{2\cos x + 3\sin x + 4}dx =$

A. $\dfrac{1}{\sqrt{3}}\tan^{-1}\left[\dfrac{1}{\sqrt{3}}(2\tan x/2 + 3)\right] + c$

B. $\dfrac{2}{\sqrt{3}}\tan^{-1}\left[\dfrac{1}{\sqrt{3}}(2\tan x/2 + 3)\right] + c$

C. $\dfrac{2}{\sqrt{3}}\tan^{-1}\left[\dfrac{1}{\sqrt{3}}(2\tan x/2 - 3)\right] + c$

D. none

Answer: B

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105. $\displaystyle\int \dfrac{1}{\cos x + \sin x}\,dx =$

A. $\dfrac{1}{\sqrt{2}}\log\left|\dfrac{\sqrt{2} - \tan(x/2) - 1}{\sqrt{2} - \tan(x/2) - 1}\right| + c$

B. $\dfrac{1}{\sqrt{2}}\log\left|\dfrac{\sqrt{2} - \tan(x/2) - 1}{\sqrt{2} - \tan(x/2) + 1}\right| + c$

C. $\dfrac{1}{\sqrt{2}}\log\left|\dfrac{\sqrt{2} + \tan(x/2) - 1}{\sqrt{2} - \tan(x/2) + 1}\right| + c$

D. none

Answer: C

106. $\int \dfrac{dx}{\cos x - \sin x} =$

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

B. $\dfrac{1}{\sqrt{2}} \log \left| \tan \left(\dfrac{x}{2} + \dfrac{3\pi}{8} \right) \right| + c$

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

D. $\dfrac{1}{\sqrt{2}} \log \left| \cot \left(\dfrac{x}{2} \right) \right| + c$

Answer: B

107. $\int \dfrac{dx}{\cos x + \sqrt{3}\sin x} =$

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

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

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

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

Answer: A

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108. $\int \dfrac{1}{1 + \sin 2x}\,dx =$

A. $\dfrac{-1}{1 + \tan x} + c$

B. $\dfrac{1}{1 + \tan x} + c$

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

D. $\dfrac{1}{1 - \tan x} + c$

Answer: A

109. $\displaystyle\int \dfrac{1}{2 + \cos 2x} = dx$

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

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

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

D. none

Answer: B

110. $\int \dfrac{1}{1 + \left(\sin^2 x\right)} dx =$

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

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

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

D. none

Answer: A

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111. $\int \dfrac{1}{5 + 4\cos^2 x} dx =$

A. $\dfrac{3}{\sqrt{5}} \tan^{-1}\left(\dfrac{\sqrt{5}}{3}\tan x\right) + c$

B. $\dfrac{1}{3\sqrt{5}} \tan^{-1}\left(\dfrac{\sqrt{5}}{3}\cos x\right) + c$

C. $\dfrac{1}{3\sqrt{5}}\tan^{-1}\left(\dfrac{\sqrt{5}}{3}\tan x\right) + c$

D. none

Answer: C

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112. $\displaystyle\int \dfrac{1}{4\cos^2 x + 9\sin^2 x}dx =$

A. $\dfrac{1}{6}\tan^{-1}\left(\dfrac{3}{2}\tan x\right) + c$

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

C. $\dfrac{1}{6}\tan^{-1}\left(\dfrac{3}{5}\tan x\right) + c$

D. none

Answer: A

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113. $\int \dfrac{1}{\sin^2 x + 2\sin x \cos x + 5\cos^2 x} dx =$

A. $\dfrac{1}{2}\tan^{-1}\left[\dfrac{1}{2}(\tan x - 1)\right] + c$

B. $\dfrac{1}{2}\tan^{-1}\left[\dfrac{1}{2}(\tan x + 1)\right] + c$

C. $\dfrac{1}{2}\tanh^{-1}\left[\dfrac{1}{2}(\tan x + 1)\right] + c$

D. none

Answer: B

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114. $\int \dfrac{1}{1 + \cos^2 x + 2\cos x \sin x} dx =$

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

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

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

D. none

Answer: A

115. $\int \dfrac{1}{4\sin^2 x + 3\sin x \cos x + 2\cos^2 x} dx =$

A. $\dfrac{1}{\sqrt{23}}\tan^{-1}\left(\dfrac{8\tan x + 3}{\sqrt{23}}\right) + c$

B. $\dfrac{2}{\sqrt{23}}\tan^{-1}\left(\dfrac{8\tan x + 3}{\sqrt{23}}\right) + c$

C. $\dfrac{2}{\sqrt{23}}\tan^{-1}\left(\dfrac{8\tan x - 3}{\sqrt{23}}\right) + c$

D. none

Answer: B

116. $\int \dfrac{dx}{a^2\sin^2x + b^2\cos^2x} =$

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

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

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

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

Answer: A

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117. $\int \dfrac{3\cos x + 2\sin x}{4\sin x + 5\cos x}dx =$

A. $\dfrac{23x}{41} - \dfrac{2}{41}\log|4\sin x + 5\cos x| + c$

B. $\dfrac{2x}{41} + \dfrac{23}{41}\log|4\sin x + 5\cos x| + c$

C. $\dfrac{23x}{41} + \dfrac{2}{41}\log|4\sin x + 5\cos x| + c$

D. none

118. $\displaystyle\int \dfrac{\sin x + 8\cos x}{4\sin x + 6\cos x} = dx$

A. $x + \dfrac{1}{2}\log(4\sin x + 6\cos x) + C$

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

C. $x + \log(2\sin x + 3\cos x) + C$

D. $\dfrac{1}{2}\log(4\sin x + 6\cos x) + C$

119. $\int \dfrac{3\cos x - 2\sin x}{4\sin x + 5\cos x} dx =$

A. $\dfrac{22}{41}\log|5\cos x + 4\sin x| - \dfrac{7}{41}x + c$

B. $\dfrac{22}{41}\log|5\cos x + 4\sin x| + \dfrac{7}{41}x + c$

C. $\dfrac{22}{41}\log|5\cos x - 4\sin x| + \dfrac{7}{41}x + c$

D. none

Answer: B

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120. $\int \dfrac{\sin x}{2\cos x + 3\sin x} dx =$

A. $\dfrac{2}{13}\log|2\cos x + 3\sin x| - \dfrac{3}{13} + c$

B. $\dfrac{2}{13}\log|2\cos x - 3\sin x| + \dfrac{3}{13} + c$

C. $-\dfrac{2}{13}\log|2\cos x + 3\sin x| + \dfrac{3}{13} + c$

D. none

Answer: C

121. $\int \dfrac{\cos x}{3\cos x + 4\sin x} dx =$

A. $\dfrac{4}{25}\log|3\cos x + 4\sin x| - \dfrac{1}{25}x + c$

B. $\dfrac{4}{35}\log|3\cos x - 4\sin x| + \dfrac{2}{25}x + c$

C. $\dfrac{4}{25}\log|3\cos x - 4\sin x| - \dfrac{2}{25}x + c$

D. $\dfrac{4}{25}\log|3\cos x + 4\sin x| + \dfrac{3}{25}x + c$

Answer: D

122. Evaluate the integerals.

$\int \dfrac{1}{1 + \tan x} dx$

A. $\dfrac{1}{2}\log|\cos x + \sin x| + \dfrac{1}{2}x + c$

B. $\dfrac{1}{2}\log|\cos x + \sin x| - \dfrac{1}{2}x + c$

C. $\dfrac{1}{2}\log|\cos x + \tan x| + \dfrac{1}{2}x + c$

D. none

Answer: A

123. $\displaystyle\int \dfrac{\sin x}{\sin x - \cos x} dx =$

A. $\dfrac{1}{2}[x + \log|\sin x - \cos x|] + c$

B. $\dfrac{1}{2}\log|\cos x + \sin x| - \dfrac{1}{2}x + c$

C. $\log|\sin x - \cos x| - x + c$

D. none

Answer: A

124. $\int \dfrac{\cos x}{\cos x + \sin x} dx =$

A. $\dfrac{1}{2}[x - \log|\cos x + \sin x|] + c$

B. $\dfrac{1}{2}[x - \log|\cos x - \sin x|] + c$

C. $\dfrac{1}{2}[x + \log|\cos x + \sin x|] + c$

D. $\dfrac{1}{2}[x + \log|\cos x + \sin x|] + c$

Answer: C

125. $\int \dfrac{\cos x}{\cos x - \sin x} dx =$

A. $\dfrac{1}{2}\log|\cos x - \sin x| - \dfrac{1}{2}x + c$

B. $-\dfrac{1}{2}\log|\cos x + \sin x| + \dfrac{1}{2}x + c$

C. $-\frac{1}{2}\log|\cos x - \sin x| + \frac{1}{2}x + c$

D. none

Answer: C

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126. If the integral $\int \frac{5\tan x}{\tan x - 2} dx = x + a\log|\sin x - 2\cos x| + c$ then a is equal to

A. 1

B. 2

C. -1

D. -2

Answer: B

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127. $\int \dfrac{1}{\sin x + \sec x} dx =$

A. $\dfrac{1}{2\sqrt{3}} \log\left|\dfrac{\sqrt{3} + \sin x - \cos x}{\sqrt{3} - \sin x + \cos x}\right| - \tan^{-1}(\sin x + \cos x) + c$

B. $\dfrac{1}{2\sqrt{3}} \log\left|\dfrac{\sqrt{3} + \sin x - \cos x}{\sqrt{3} - \sin x + \cos x}\right| + \tan^{-1}(\sin x + \cos x) + c$

C. $\dfrac{1}{2\sqrt{3}} \log\left|\dfrac{\sqrt{3} + \sin x - \cos x}{\sqrt{3} - \sin x + \cos x}\right| - \tan^{-1}(\sin x - \cos x) + c$

D. none

Answer: B

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128. $\int \dfrac{dx}{\operatorname{cosec} x + \cos x} =$

A. $\dfrac{1}{\sqrt{3}} \log\left|\dfrac{\cos x - \sin x - \sqrt{3}}{\cos x - \sin + \sqrt{3}}\right| - \tan^{-1}(\cos x + \sin x) + c$

B. $\dfrac{1}{2\sqrt{3}}\log\left|\dfrac{\cos x - \sin x - \sqrt{3}}{\cos x - \sin x + \sqrt{3}}\right| - \tan^{-1}(\cos x + \sin x) + c$

C. $\dfrac{1}{\sqrt{3}}\log\left|\dfrac{\cos x - \sin x - \sqrt{3}}{\cos x - \sin + \sqrt{3}}\right| + \tan^{-1}(\cos x + \sin x) + c$

D. $\dfrac{1}{2\sqrt{3}}\log\left|\dfrac{\cos x - \sin x - \sqrt{3}}{\cos x - \sin + \sqrt{3}}\right| + \tan^{-1}(\cos x + \sin x) + c$

Answer: B

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129. If $\displaystyle\int \dfrac{\left(x^2 - 1\right)}{(x+1)^2\sqrt{x\left(x^2 + x + 1\right)}}\,dx = A\tan^{-1}\left(\dfrac{\sqrt{x^2 + x + 1}}{x}\right) + c$ in which c

is a constant then A =

A. 3

B. 2

C. 1

D. 1/2

Answer: B

---

130. If $\int \dfrac{dx}{\left(1 + \sqrt{x}\right)\sqrt{x - x^2}} = \dfrac{A\sqrt{x}}{\sqrt{1 - x}} + \dfrac{B}{\sqrt{1 - x}} + C,$ where C is a real

constant then $A + B =$

A. 0

B. 1

C. 2

D. 3

Answer: A

131. $\int \dfrac{1}{\sqrt{\cos^4 - x - \cos^2 x \sin^2 x}} dx =$

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

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

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

D. none

Answer: C

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132. $\int \dfrac{1}{\sqrt{\csc^2 x + \cot^2 x}} dx =$

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

B. $-\sinh^{-1}(\cos x) + c$

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

D. none

Answer: B

EXERCISE 1C

1. $\int x^2 e^x dx =$

A. $e^x \left(x^2 - 1 \right) + c$

B. $e^x \left(x^2 + 2x + 1 \right) + c$

C. $e^x \left(x^2 - 2x + 2 \right) + c$

D. none

Answer: C

2. $\int x2^x dx =$

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

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

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

D. none

Answer: A

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3. If $\int x^3 e^{5x} dx = \dfrac{e^{5x}}{5^4}(f(x)) + c$, then f(x)=

A. $e^{5x}\left[\dfrac{x^3}{5} - \dfrac{3x^2}{25} + \dfrac{6x}{125} - \dfrac{6}{625}\right] + c$

B. $e^{5x}\left[\dfrac{x^3}{5} - \dfrac{3x^2}{25} - \dfrac{6x}{125} - \dfrac{6}{625}\right] + c$

C. $e^{5x} \left[\dfrac{x^3}{5} + \dfrac{3x^2}{25} + \dfrac{6x}{125} - \dfrac{6}{625} \right] + c$

D. $e^{5x} \left[\dfrac{x^3}{5} - \dfrac{3x^2}{25} + \dfrac{6x}{125} + \dfrac{6}{625} \right] + c$

Answer: A

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4. If $\int x^3 e^{5x} dx - \dfrac{e^{5x}}{5^4}(f(x)) + 0_3$ then $f(x) =$

A. $\dfrac{x^3}{5} - \dfrac{3x^2}{5^2} + \dfrac{6x}{5^3} - \dfrac{6}{5^4}$

B. $5x^3 - 5^2x^2 + 5^3x - 6$

C. $5^2x^3 - 15x^2 + 30x - 6$

D. $5^3x^3 - 75x^2 + 30x - 6$

Answer: D

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5. $\int x\cos x\, dx =$

    A. $x\sin x - \cos x + c$

    B. $x\sin x + \cos x + c$

    C. $x\sin x - 2\cos x + c$

    D. none

Answer: B

6. $\int x^2\cos^2 x\, dx =$

    A. $\dfrac{1}{2}\left[\dfrac{x^3}{3} + \dfrac{x^2}{2}\sin 2x + \dfrac{x\cos 2x}{2} + \dfrac{\sin 2x}{4}\right] \mid c$

    B. $\dfrac{1}{2}\left[\dfrac{x^3}{3} + \dfrac{x^2}{2}\sin 2x + \dfrac{x\cos 2x}{2} - \dfrac{\sin 2x}{4}\right] \mid c$

C. $\dfrac{1}{2}\left[\dfrac{x^3}{3} - \dfrac{x^2}{2}\sin2x - \dfrac{x\cos2x}{2} - \dfrac{\sin2x}{4}\right]|\,c$

D. none

Answer: B

7. $\int x\cos2x\,dx =$

A. $\dfrac{x}{2}\sin2x + \dfrac{1}{4}\cos2x + c$

B. $\dfrac{x}{2}\sin2x + \dfrac{1}{2}\cos2x + c$

C. $\dfrac{x}{2}\sin2x - \dfrac{1}{4}\cos2x + c$

D. $\dfrac{x}{2}\sin2x - \dfrac{1}{2}\cos2x + c$

Answer: A

8. $\int x^2 \sin^2 x \, dx =$

A. $\dfrac{1}{2}\left[\dfrac{x^3}{3} - \dfrac{x^2}{2}\sin 2x - \dfrac{x}{2}\cos 2x - \dfrac{1}{4}\sin 2x\right] + c$

B. $\dfrac{1}{2}\left[\dfrac{x^3}{3} - \dfrac{x^2}{2}\sin 2x + \dfrac{x}{2}\cos 2x - \dfrac{1}{4}\sin 2x\right] + c$

C. $\dfrac{1}{2}\left[\dfrac{x^3}{3} + \dfrac{x^2}{2}\sin 2x + \dfrac{x}{2}\cos 2x + \dfrac{1}{4}\sin 2x\right] + c$

D. none

Answer: B

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9. $\int x \sinh x \, dx =$

A. $x \cosh x + \sinh x + c$

B. $-\cosh x + \sinh x + c$

C. $x\cosh x - \sinh x + c$

D. none

Answer: C

10. $\int \log x \, dx =$

A. $x(\log x - 1) + c$

B. $x(\log x + 1) + c$

C. $x\log x - 1 + c$

D. $x\log x + 1 + c$

Answer: A

11. $\int x^2 \log x \, dx =$

A. $\dfrac{x^3}{3}\left[\log x - \dfrac{1}{2}\right] + c$

B. $\dfrac{x^3}{3}\left[\log x - \dfrac{1}{3}\right] + c$

C. $\dfrac{x^3}{3}\left[\log x + \dfrac{1}{3}\right] + c$

D. none

Answer: B

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12. Evaluate the integerals.

$\int x^n \log x \, dx \, on \, (0, \infty)$, n is a real nuber and $n \neq -1$.

A. $\dfrac{x^{n-1}}{n+1}\left[\log x - \dfrac{1}{n+1}\right] + c$

B. $\dfrac{x^{n-1}}{n+1}\left[\log x + \dfrac{1}{n+1}\right] + c$

C. $\dfrac{x^{n-1}}{n+1}\left[\log x - \dfrac{1}{n+1}\right] - x^n + c$

D. none

Answer: A

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13. $\displaystyle\int \log\left(x + \sqrt{x^2 - 1}\right) dx =$

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

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

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

D. none

Answer: B

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14. If $\int \log\left(a^2 + x^2\right)dx = h(x) + c$, then h(x)=

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

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

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

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

Answer: C

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15. $\int x\sec x\tan x\,dx =$

A. $x\sec x - \log|\sec x - \tan x| - c$

B. $x\sec x + \log|\sec x - \tan x| - c$

C. $x\sec x - \log|\sec x + \tan x| + c$

D. none

Answer: C

---

16. $\int \cosec^2 x \, dx = $?

A. $-x \cot x - \log|\sin x| + c$

B. $x \cot x - \log|\sin x| + c$

C. $x \cot x + \log|\sin x| + c$

D. $-x \cot x + \log|\sin x| + c$

Answer: D

17. $\int \sin^{-1}x\,dx =$

A. $x\sin^{-1}x - \sqrt{1 - x^2} + c$

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

C. $x\sin^{-1}x + \dfrac{1}{2}\sqrt{1 - x^2} + c$

D. $x\sin^{-1}x - \dfrac{1}{2}\sqrt{1 - x^2} + c$

Answer: B

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18. $\int \cos^{-1}x\,dx$

A. $x\cos^{-1}x - \sqrt{1 - x^2} + c$

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

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

D. $x\cos^{-1}x + \sqrt{1 + x^2} + c$

Answer: A

---

19. Evaluate $\int x \sin^{-1}x \, dx$ " on " $(-1,1)$.

A. $\dfrac{1}{2}\left[\left(x^2 + \dfrac{1}{2}\right)\sin^{-1}x + \dfrac{x}{2}\sqrt{1 + x^2} + c\right]$

B. $\dfrac{1}{3}\left[\left(x^2 - \dfrac{1}{2}\right)\sin^{-1}x - \dfrac{x}{2}\sqrt{1 - x^2} + c\right]$

C. $\dfrac{1}{2}\left[\left(x^2 - \dfrac{1}{2}\right)\sin^{-1}x + \dfrac{x}{2}\sqrt{1 - x^2} + c\right]$

D. $\dfrac{1}{3}\left[\left(x^2 - \dfrac{1}{2}\right)\sin^{-1}x + \dfrac{x}{2}\sqrt{1 - x^2} + c\right]$

Answer: C

---

20. $\int \cot^{-1}x \, dx =$

A. $x\cot^{-1}x + \dfrac{1}{2}\log\left(1 + x^2\right) + c$

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

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

D. $x\cot^{-1}x + \dfrac{1}{2}\log\left(1 + x^2\right) + c$

Answer: A

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21. $\int \sec^{-1}x\,dx =$

A. $x\sec^{-1}x + \cosh^{-1}x + c$

B. $x\sec^{-1}x - \cosh^{-1}x + c$

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

D. none

Answer: B

22. $\int \tan^{-1}\left(\dfrac{2x}{1 - x^2}\right) dx =$

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

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

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

D. none

Answer: C

23. $\int \cos^{-1}\left(2x^2 - 1\right) dx =$

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

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

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

D. none

Answer: A

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24. $\int \sin^{-1}\left(3x - 4x^3\right)dx =$

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

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

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

D. none

Answer: B

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25. $\int x\tan^{-1}x\,dx =$

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

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

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

D. none

Answer: A

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26. $\int \tan\left(\sqrt{\dfrac{1-x}{1+x}}\right)dx =$

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

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

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

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

Answer: A

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27. $\int \sin^{-1}\left(\dfrac{2x}{1 + x^2}\right)dx = f(x) - \log\left(1 + x^2\right) + c \Rightarrow f(x) =$

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

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

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

D. $-x\tan^{-1}x$

Answer: A

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28. If

$$I_1 = \int \sin^{-1}\left(\frac{2x}{1 + x^2}\right) dx, \ I_2 = \int \cos^{-1}\left(\frac{1 - x^2}{1 + x^2}\right) dx, \ I_3 = \int \tan^{-1}\left(\frac{2x}{1 - x^2}\right) dx$$

then the value of $I_1 + I_2 - I_3 =$

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

B. $2\left[x\tan^{-1}x - \log\left(1 + x^2\right)\right] | + c$

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

D. 0

Answer: A

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29. $\int \sinh^{-1}x\,dx =$

A. $x\sinh^{-1}x - \sqrt{1 + x^2} + c$

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

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

D. none

Answer: A

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30. $\int \cosh^{-1}x\,dx =$

A. $x\cosh^{-1}x + \sqrt{x^2 + 1} + c$

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

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

D. none

Answer: B

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31. $\int \dfrac{x + \sin x}{1 + \cos x} dx =$

A. $x\tan\dfrac{x}{2} + c$

B. $-x\tan\dfrac{x}{2} + c$

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

D. $-x^2\tan x + c$

Answer: A

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32. `int ((x)/(2)"sec"^(2)(x)/(2)+"tan"^(x)/(2))dx$

A. $\sec\dfrac{x}{2} + c$

B. $x\tan\dfrac{x}{2} + c$

C. $x\sec\dfrac{x}{2} + \tan\dfrac{x}{2} + c$

D. none

Answer: B

33. $\int \dfrac{x - \sin x}{1 + \cos x} dx = \tan\left(\dfrac{x}{2}\right) + p\log\left|\sec\left(\dfrac{x}{2}\right)\right| + c \Rightarrow p =$

A. -4

B. 4

C. 2

D. -2

Answer: A

34. $\int \cos\sqrt{x}\,dx =$

A. $2\sqrt{x}\sin\sqrt{x} + 2\cos\sqrt{x} + c$

B. $2\sqrt{x}\sin\sqrt{x} + 2\sin\sqrt{x} + c$

C. $2\sqrt{x}\sin\sqrt{x} - 2\cos\sqrt{x} + c$

D. $\sqrt{x}\cos\sqrt{x} - 2\cos\sqrt{x} + c$

Answer: A

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35. $\int x^3 \cdot e^{x^2}\,dx =$

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

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

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

D. none

Answer: B

36. $\int x \left(\dfrac{\sec2x - 1}{\sec2x + 1} \right) dx =$

A. $x\tan x - \log|\sec x| \dfrac{x^2}{2} + c$

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

C. $x\tan x + \log|\sec x| - \dfrac{x^2}{2} + c$

D. $x\tan x + \log|\sec x| \dfrac{x^2}{2} + c$

Answer: B

37. $\int \dfrac{x}{1 + \cos x}\,dx =$

A. $x\tan\dfrac{x}{1} + 2\log\left|\sec\dfrac{x}{2}\right| + c$

B. $x\tan\dfrac{x}{2} - 2\log\left|\sec\dfrac{x}{2}\right| + c$

C. $x\tan\dfrac{x}{2} - 2\log\left|\sec\dfrac{x}{2}\right| - x + c$

D. none

Answer: B

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38. $\int \sin(\log x) + \cos(\log x)\,dx =$

A. $x\sin(\log x) + c$

B. $x - \sin(\log x) + c$

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

D. none

Answer: A

39. $\int \sin(\log x)dx =$

A. $\dfrac{x}{2}[\sin(\log x) - \cos(\log x)] + c$

B. $\dfrac{x}{2}[\sin(\log x) - \cos(\log x)] - x + c$

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

D. $\dfrac{x}{2}[\sin(\log x) + \tan(\log x)] - c$

Answer: A

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40. $\int \dfrac{\log x}{(1 + \log x)^2} dx =$

A. $\dfrac{-x}{1 + \log x} + c$

B. $\dfrac{x}{1 + \log x} + c$

C. $\dfrac{x}{1 - \log x} + c$

D. none

Answer: B

41. $\int \dfrac{1}{\log x} - \dfrac{1}{(\log x)^2} dx =$

A. $\dfrac{2x}{\log x} + c$

B. $\dfrac{x}{1 + \log x} + c$

C. $\dfrac{x}{\log x} + c$

D. none

Answer: C

42. $\int e^x \left(x^2 + 2x + 3 \right) dx =$

A. $e^x \left(x^2 - 3 \right) + c$

B. $e^x \left(x^2 + 3 \right) - x + c$

C. $e^x \left(x^2 + 3 \right) + c$

D. $e^x \left(x^2 - 3 \right) - x + c$

Answer: C

43. $\int (x + 1)^2 e^x dx =$

A. $x^2 + c$

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

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

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

Answer: D

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44. $\int e^x(\cos x - \sin x)dx =$

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

B. $\sin x + c$

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

D. $\sin x - c$

Answer: C

45. Evaluate the integerals.

$$\int e^x \left(\tan x + \sec^2 x \right) dx$$

$$on I \subset R \backslash \left\{ (2n + 1)\frac{\pi}{2} : n \in Z \right\}.$$

A. $e^x \sec x + c$

B. $e^x \tan x \sec x + c$

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

D. none

Answer: C

46. $\int e^x \left(\tan x + \tan^2 x \right) dx =$

A. $e^x(\tan x - 1) + c$

B. $e^x(\tan x - 1)x + c$

C. $e^x(\tan x + 1) + c$

D. none

Answer: A

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47. $\int e^x \cosec x (1 - \cot x) dx =$

A. $-e^x \cot x + c$

B. $e^x \cosec x + c$

C. $-e^x \cosec x + c$

D. $e^x \cos x + c$

Answer: B

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

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

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

C. $e^x \csc x + c$

D. $e^x \csc x + c$

Answer: B

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49. $\int e^x \sec x (1 + \tan x) dx =$

A. $\tan x + c$

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

C. $e^x \mathrm{cosec} x + c$

D. none

Answer: B

50. If $\int e^x(1 + x) \cdot \sec^2\left(xe^x\right)dx = f(x) + $ constant, then $f(x) =$

A. cos(xe^x)

B. sin(xe^x)

C. 2tan in x

D. tan(x(e^x))

Answer: D

51. Evaluate the integerals.

$$\int e^x \left(\frac{1 + x\log x}{x} \right) dx \, on \, (0, \infty).$$

52. $\int e^x (x + 1)\log x \, dx =$

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

B. $e^x(x\log x - 1) + c$

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

D. none

Answer: B

53. $\int \dfrac{e^x}{x+2}[1 + (x+2)\log(x+2)]dx =$

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

B. $-e^x\dfrac{1}{x+2} + c$

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

D. none

Answer: C

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54. Evaluate the integerals.

$$\int e^x\left(\tan^{-1}x + \dfrac{1}{1+x^2}\right)dx, x \in R.$$

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

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

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

D. none

Answer: A

55. $\int e^x \left(\dfrac{1 + \sin x}{1 + \cos x} \right) dx =$

A. $e^x \tan x/2 + c$

B. $e^x \sec x/2 \tan x/2 + c$

C. $e^x 2 \tan x/2 + c$

D. none

Answer: A

56. If $\int e^x \left[\dfrac{\cos x - \sin x}{1 - \cos 2x} \right] dx =$

A. $\dfrac{-1}{2} e^x \cosec x - x + c$

B. $\dfrac{1}{2} e^x \cosec x + c$

C. $\dfrac{1}{2} e^x \sec x + c$

D. none

Answer: B

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57. $\int e^x \left[\dfrac{\cos x + \sin x}{1 + \cos 2x} \right] dx =$

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

B. $\dfrac{1}{2} e^x \sin x + c$

C. $\dfrac{1}{2} e^x \cos x + c$

D. none

Answer: A

58. If $\int e^x \left[\dfrac{\cos x - \sin x}{1 - \cos 2x} \right] dx=$

A. $e^x \cot\left(\dfrac{x}{2}\right)$

B. $e^x \cot\left(\dfrac{x}{2}\right)$

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

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

Answer: C

59. $\int \left(\dfrac{2 - \sin 2x}{1 - \cos 2x} \right) e^x dx =$

A. $- e^x \cot x + c$

B. $e^x \cot x + c$

C. $2 e^x \cot x + c$

D. $- 2 e^x \cot x + c$

Answer: A

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60. $\int e^x \left(\log x + \dfrac{1}{x^2} \right) dx =$

A. $e^x \log x + c$

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

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

D. $\dfrac{e^x}{x^2} + c$

Answer: B

61. $\displaystyle\int \dfrac{xe^x}{(x+1)^2} = dx$

A. $\dfrac{e^x}{x+1} + c$

B. $- \dfrac{e^x}{x+1} + c$

C. $\dfrac{e^x}{(x+1)^2} + c$

D. $- \dfrac{e^x}{(x+1)^2} + c$

Answer: A

62. $\int e^x \left(\dfrac{x + 2}{(x + 3)^2} \right) dx$

A. $e^x \dfrac{1}{x + 3} - x + c$

B. $e^x \dfrac{1}{x + 3} + c$

C. $e^x \dfrac{1}{x - 3} + c$

D. none

Answer: B

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63. $\int e^x \left(\dfrac{2 + \sin 2x}{1 + \cos 2x} \right) dx =$

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

B. $2e^x \sec^2 x + c$

C. $2e^x \sec 2x + c$

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

Answer: D

64. $\int \dfrac{(x + 1)dx}{x\left(1 + xe^x\right)} =$

A. $\log\left(\dfrac{1 + xe^x}{xe^x}\right) + c$

B. $\log\left(\dfrac{xe^x}{1 + xe^x}\right) + c$

C. $\log xe^2\left(1 + xe^x\right) = c$

D. $\log\left(1 + xe^x\right) + c$

Answer: B

65. $\int e^x \left\{ \dfrac{1 - x}{1 + x^2} \right\}^2 dx =$

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

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

C. $\dfrac{e^x}{1 + x^2} + c$

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

Answer: C

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66. $\int e^{-x}(\sin x - \cos x)dx =$

A. $- e^x \sin x + c$

B. $e^x \sin x + c$

C. $-e^x\cos x + c$

D. none

Answer: A

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67. If $\int e^x(2 + \sin 2x)\sec^2 x\, dx = f(x) + c$ then $f(x) =$

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

B. $e^x(\sec x + \tan x)$

C. $2e^x\tan x$

D. none

Answer: C

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68. $\displaystyle\int \frac{e^x\left(x^2 + 1\right)}{(1 + x)^2} dx =$

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

B. $\dfrac{e^x(x - 2)}{x + 1} + c$

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

D. none

Answer: C

69. $\displaystyle\int e^x\left(x + \sqrt{1 + x^2}\right)\left(1 + \frac{1}{\sqrt{1 + x^2}}\right) dx =$

A. $e^x \cosh^{-1} x + c$

B. $\dfrac{e^x}{\sqrt{1 + x^2}} dx =$

C. $e\sinh^{-1} + c$

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

Answer: D

70. $\int e^{ax}[af(x) + f'(x)]dx =$

A. $e^{ax}f(x) + c$

B. $e^{ax}a/f(x) + c$

C. $ae^{ax}f(x) + c$

D. none

Answer: A

71. $\int \dfrac{e^x}{\sqrt{x}}(1 + 2x)dx =$

A. $\sqrt{x}e^x + c$

B. $e^x/\sqrt{x} + c$

C. $2e^x\sqrt{x} + c$

D. none

Answer: C

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72. $\int |x|dx =$

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

B. $\dfrac{x|x|}{2} + c$

C. $x^2 + c$

D. $\dfrac{|x|^2}{2} + c$

Answer: B

73. $\int \dfrac{3 - x^2}{1 - 2x + x^2} e^x dx = e^x f(x) + c \Rightarrow f(x) =$

A. $\dfrac{1 + x}{1 - x}$

B. $\dfrac{1 - x}{1 + x}$

C. $\dfrac{1 + x}{x - 1}$

D. $\dfrac{x - 1}{1 + x}$

Answer: A

74. Evaluate the integerals.

$\int e^x \cos x \, dx \, on \, R.$

A. $\dfrac{1}{4}e^x\left[\dfrac{3}{2}(\cos x + \sin x) + \dfrac{1}{10}(\cos 3x + 3\sin 3x)\right] + c$

B. $\dfrac{1}{4}e^x\left[\dfrac{3}{2}(\cos x + \sin x) - \dfrac{1}{10}(\cos 3x - 3\sin 3x)\right] + c$

C. $\dfrac{1}{4}e^x\left[\dfrac{3}{2}(\cos x + \sin x) - \dfrac{1}{10}(\cos 3x + 3\sin 3x)\right] + c$

D. $\dfrac{1}{4}e^x\left[\dfrac{3}{2}(\cos x - \sin x) + \dfrac{1}{10}(\cos 3x - 3\sin 3x)\right] + c$

Answer: A

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75. $\int e^{5x}\sin 6x\, dx =$

A. $\dfrac{e^{5x}}{61}(5\sin 6x - 6\cos 6x) + c$

B. $\dfrac{e^{5x}}{61}(5\sin 6x + 6\cos 6x) + c$

C. $\dfrac{e^{5x}}{61}(5\sin 6x - 2\cos 6x) + c$

D. $\dfrac{e^{5x}}{61}(5\sin 6x + 2\cos 6x) + c$

Answer: A

76. Evaluate the integerals.

$\int e^{ax} \sin bx\, dx\, \text{on}\, R,\, a, b,\, \in R.$

A. $\dfrac{e^{ax}}{a^2 - b^2}(a\sin bx - b\cos bx) + c$

B. $\dfrac{e^{ax}}{a^2 - b^2}(a\sin bx - b\cos bx) + c$

C. $\dfrac{e^{ax}}{a^2 - b^2}(a\sin bx + b\cos bx) + c$

D. $\dfrac{e^{ax}}{a^2 - b^2}(b\sin bx + a\cos bx) + c$

Answer: B

77. Evaluate the following integrals

$\int e^x \sin3x\cos3x\,dx$

A. $\dfrac{1}{2}e^x\left[\dfrac{1}{26}(\sin5x + 5\cos5x) + \dfrac{1}{2}(\sin x - \cos x)\right] + c$

B. $\dfrac{1}{2}e^x\left[\dfrac{1}{26}(\sin5x - 5\cos5x) + \dfrac{1}{2}(\sin x + \cos x)\right] + c$

C. $\dfrac{1}{2}e^x\left[\dfrac{1}{26}(\sin5x - 5\cos5x) + \dfrac{1}{2}(\sin x - \cos x)\right] + c$

D. $\dfrac{1}{2}e^x\left[\dfrac{1}{26}(\sin5x - 5\cos5x) - \dfrac{1}{2}(\sin x - \cos x)\right] + c$

Answer: C

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78. $\int e^{\tan^{-1}}\left(\dfrac{1 + x + x^2}{1 + x^2}\right)dx =$

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

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

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

D. $1/x^2e^{\tan^{-1}x} + c$

79. $\displaystyle\int \frac{\log x - 1}{(\log x)^2}dx =$

A. $\dfrac{x}{\log x} + c$

B. $\dfrac{\log x}{x} + c$

C. $\dfrac{1}{\log x} + c$

D. $-\dfrac{1}{\log x} + c$

80. $\int \left\{ \dfrac{(\log x - 1)}{\left(1 + (\log x)^2\right)} \right\}^2 dx =$

A. $\dfrac{\log x}{(\log x)^2 + 1} + c$

B. $\dfrac{x}{x^2 + 1} + c$

C. $\dfrac{xe^x}{1 + x^2} + c$

D. $\dfrac{x}{(\log x)^2 + 1} + c$

Answer: D

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81. $\int \dfrac{x - \frac{1}{2}\sin 2x}{\sin^2 x} dx =$

A. $-\cot x + c$

B. $x\cot x + c$

C. $-x\cot x + c$

D. $x\tan x + c$

Answer: A

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82. $\int e^{-x}\tan^{-1}\left(e^x\right)dx = f(x) - \dfrac{1}{2}\log\left(1 + e^{2x}\right) + c \Rightarrow f(x) =$

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

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

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

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

Answer: D

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83. If $\int f(x)dx = \Psi(x)$, then $\int x^5 f(x^3)dx$ ie equal to :

A. $\frac{1}{3}x^3\Psi(x^3) - \int x^2\Psi(x^3)dx + c$

B. $\frac{1}{3}\left[x^3\Psi(x^3) - \int x^2\Psi(x^3)dx\right] + c$

C. $\frac{1}{3}\left[x^3\Psi(x^3) - \int x^2\Psi(x^3)dx\right] + c$

D. $\frac{1}{3}x^3\Psi(x^3) - \int x^2\Psi(x^3)dx + c$

Answer: A

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84. If $I_n = \int(\log x)^n dx$ then $I_n + nI_{n-1} =$

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

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

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

D. none

85. $\int (\log x)^4 dx =$

A. $x\left[(\log x)^4 - 4(\log x)^3 + 12(\log x)^2 - 24\log x - 24\right] + c$

B. $x\left[(\log x)^4 + 4(\log x)^3 + 12(\log x)^2 + 24\log x + 24\right] + c$

C. $x\left[(\log x)^4 - 4(\log x)^3 - 12(\log x)^2 - 24\log x - 24\right] + c$

D. $x\left[(\log x)^4 - 4(\log x)^3 + 12(\log x)^2 - 24\log x + 24\right] + c$

86. $\int (\log x)^5 dx =$

A. $x\left[\log^5x - 5\log^4x + 20\log^3x - 60\log^2x - 120\log x - 120\right] + c$

B. $x\left[\log^5x - 5\log^4x + 20\log^3x - 60\log^2x + 120\log x - 120\right] + c$

C. $x\left[\log^5x + 5\log^4x - 20\log^3x + 60\log^2x + 120\log x - 120\right] + c$

D. $x\left[\log^5x - 5\log^4x + 20\log^3x - 60\log^2x - 120\log x - 120\right] - c$

Answer: B

87. For $x > 0$, if

$$\int(\log x)^5 dx = x\left(A(\log x)^5 + B(\log x)^4 + C(\log x)^3 + D(\log x)^2 + E(\log x) + F\right) +$$

constant then $A + B + C + D + E + F =$

A. -44

B. -42

C. -40

D. -36

Answer: A

88. If $f_n(x) = \log\log\log.... \log x (\log$ is repeated n times, then

$$\int \left[\left(x f_1(x) f_2(x) .... . f_n f(x) \right) \right]^{-1} dx =$$

A. $f_{n+1}(x) + c$

B. $\dfrac{fn_{n+1}(x)}{n+1} + c$

C. $nf_a f(x) + c$

D. $\dfrac{f_n(x)}{n} + c$

Answer: A

89. If $I_n = \int x^n \cdot e^{cx} dx$ for $n \leq 1$ then $c \cdot I_n + n \cdot I_{n-1} = c$

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

B. x^n

C. e^{cx}

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

Answer: A

90. If $I_n = \int \sin^n x \, dx$, then $nI_n - (n-1)I_{n-2} =$

A. $\sin^{n-1} x \cos x$

B. $\cos^{n-1} x \cos x$

C. $-\sin^{n-1} x \cos x$

D. $-\cos^{n-1} x \cos x$

Answer: C

91. $\int \sin^5, dx =$

A. $\dfrac{-\sin^4 x \cos x}{5} - \dfrac{4}{15}\sin^2 \cos x + \dfrac{8}{15}\cos x + c$

B. $\dfrac{-\sin^4 x \cos x}{5} - \dfrac{4}{15}\sin^2 \cos x - \dfrac{8}{15}\cos x + c$

C. $\dfrac{-\sin^4 x \cos x}{5} + \dfrac{4}{15}\sin^2 \cos x + \dfrac{8}{15}\cos x + c$

D. none

Answer: B

92. $\int \cos^4 x \, dx =$

A. $\dfrac{\cos^2 x - \sin x}{4} - \dfrac{3}{8}\cos x \sin x - \dfrac{3}{8}x + c$

B. $\dfrac{\cos^2 x - \sin x}{4} + \dfrac{3}{8}\cos x \sin x - \dfrac{3}{8}x + c$

C. $\dfrac{\cos^2 x - \sin x}{4} + \dfrac{3}{8}\cos x \sin x + \dfrac{3}{7}x + c$

D. $\dfrac{\cos^2 x - \sin x}{4} + \dfrac{3}{8}\cos x \sin x + \dfrac{3}{8}x + c$

Answer: D

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93. $\displaystyle\int \cos^5 x\, dx =$

A. $\dfrac{\cos^4 x \sin x}{3} - \dfrac{4}{15}\cos^2 x \sin x - \dfrac{8}{15}\sin x + c$

B. $\dfrac{\cos^4 x \sin x}{3} + \dfrac{4}{15}\cos^2 x \sin x - \dfrac{8}{15}\sin x + c$

C. $\dfrac{\cos^4 x \sin x}{3} - \dfrac{4}{15}\cos^2 x \sin x - \dfrac{8}{15}\sin x + c$

D. none

Answer: A

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94. $\int \cos^6 x \, dx =$

A. $\dfrac{1}{6} \cos^2 x \sin x - \dfrac{5}{24} \cos^3 x \sin x - \dfrac{15}{48} x + \dfrac{15}{48} x + c$

B. $\dfrac{1}{6} \cos^2 x \sin x + \dfrac{5}{24} \cos^3 x \sin x - \dfrac{15}{48} x + \dfrac{15}{48} x + c$

C. $\dfrac{1}{6} \cos^2 x \sin x + \dfrac{5}{24} \cos^3 x \sin x + \dfrac{15}{48} x + \dfrac{15}{48} x + c$

D. none

Answer: C

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95. If $I_{m,n} = \int x^m (\log x)^n \, dx$ then $I_{m.n} =$

A. $\dfrac{x^{m+1}}{m+1} (\log x)^n - \dfrac{n}{n+1} I_{m,n-1}$

B. $\dfrac{x^{m+1}}{m+1} (\log x)^n + \dfrac{n}{n+1} I_{m,n-1}$

C. $\dfrac{x^{m+1}}{m+1} (\log x)^n - \dfrac{n}{n-1} I_{m,n-1}$

D. none

Answer: A

96. If $I_n = \int \left(e^{ax}\right)\dfrac{dx}{x^n}$, then $I_n =$

A. $\dfrac{e^x}{(n-1)x^{n-1}} + \dfrac{a}{n-1}I_{n-1}$

B. $\dfrac{-e^{ax}}{(n-1)x^{n-1}} + \dfrac{a}{n-1}I_{n-1}$

C. $\dfrac{-e^x}{(n-1)x^{n-1}} - \dfrac{a}{n-1}I_{n-1}$

D. $\dfrac{-e^{ax}}{(n-1)x^{n-1}} + \dfrac{a}{n+1}I_{n+1}$

Answer: B

97. If $I_n = \int \dfrac{\sin nx}{\sin x}dx$ where $n > 1$, then $I_n - I_{n-2}$

A. $\dfrac{2}{n-1}\cos(n-1)x$

B. $\dfrac{2}{n-1}\sin(n-1)x$

C. $\dfrac{2}{3}\cos nx$

D. $\dfrac{2}{3}\sin nx$

Answer: B

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98. If $I_n = \int \dfrac{\sin nx}{\cos x}dx$, then $I_n =$

A. $\dfrac{-2}{n-1}\cos(n-1)x - I_{n-2}$

B. $\dfrac{-2}{n+1}\cos(n-1)x - I_{n-2}$

C. $\dfrac{-2}{n-1}\cos(n+1)x + 1 - I_{n-2}$

D. none

Answer: A

99. If $I_n = \int \dfrac{\cos nx}{\cos x} dx$, then $I_n =$

A. $\dfrac{2}{n+1} \sin(n-1)x - I_{n-2}$

B. $\dfrac{2}{n-1} \sin(n+1)x - I_{n-2}$

C. $\dfrac{2}{n-1} \sin(n-1)x - I_{n-2}$

D. $\dfrac{3}{n-1} \sin(n+1)x + I_{n-2}$

Answer: C

100. If $I_n = \int \dfrac{t^n}{1+t^2} dt$, then $I_{n-2} =$

A. $\dfrac{t^{n+1}}{n+1} + I_n$

B. $\dfrac{t^{n+1}}{n+1} - I_n$

C. $\dfrac{t^{n+1}}{n-1} - I_n$

D. $\dfrac{t^{n+1}}{2n+1} - I_n$

Answer: B

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101. For any integer $n \le 2$ let $I_n = \int x dx$. If $I_n = \dfrac{1}{a}\tan^{n-1}x - bl_{a-2}$ for $n \ge 2$, then ordered pair (a,b) =

A. $\left(n-1, \dfrac{n-2}{n+1}\right)$

B. $(n, 1)$

C. $(n-1, 1)$

D. $\left(n-1\dfrac{n-1}{n-2}\right)$

Answer: C

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102. $\int \tan^5\theta d\theta =$

A. $\dfrac{1}{4}\tan^4\theta - \dfrac{1}{2}\tan^2\theta + \log|\sec\theta| + c$

B. $\dfrac{1}{4}\tan^4\theta + \dfrac{1}{2}\tan^2\theta + \log|\sec\theta| + c$

C. $\dfrac{1}{4}\tan^4\theta - \dfrac{1}{2}\tan^2\theta - \log|\sec\theta| + c$

D. none

Answer: A

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103. $\int \tan^6 x dx =$

A. $\dfrac{\tan^5 x}{5} - \dfrac{\tan x^3 x}{3} + \tan x + x + c$

B. $\dfrac{\tan^5 x}{5} - \dfrac{\tan x^3 x}{3} + \tan x - x + c$

C. $\dfrac{\tan^5 x}{5} - \dfrac{\tan x^3 x}{3} - \tan x - x + c$

D. none

Answer: B

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104. Obtain reduction formula for $I_n = \int \cot^n x\, dx$, n being a positive integer , $n \geq 2$ and deduce the value of $\int \cot^4 x\, dx$.

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

B. $-\frac{1}{3}\cot^3 x + \cot x - x + c$

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

D. $\frac{1}{3}\cot^3 x - \cot x - x - c$

Answer: A

105. $\int \cot^7 x\, dx =$

A. $-\dfrac{\cot^6 x}{6} + \dfrac{\cot^4 x}{4} - \dfrac{\cot^2 x}{2} - \log|\sin x|c$

B. $\dfrac{\cot^6 x}{6} + \dfrac{\cot^4 x}{4} - \dfrac{\cot^2 x}{2} - \log|\sin x|c$

C. $-\dfrac{\cot^6 x}{6} - \dfrac{\cot^4 x}{4} - \dfrac{\cot^2 x}{2} - \log|\sin x|c$

D. none

Answer: A

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106. $\int \sec^4 x\, dx =$

A. $\dfrac{1}{3}\sec^2 x \tan x + \dfrac{2}{3}\ln|\sec x + \tan x| + c$

B. $\dfrac{1}{3}\sec^2 x \tan x - \dfrac{2}{3}\tan x - c$

C. $\dfrac{1}{3}\sec^2 x \tan x + \dfrac{2}{3}\tan x + c$

D. none

Answer: C

---

107. $\int \sec^5 x \, dx$.

A. $\frac{1}{4}\sec^3 x \tan x - \frac{3}{8}\sec x \tan x + \frac{3}{8}\log|\sec x \tan x| + c$

B. $\frac{1}{4}\sec^3 x \tan x + \frac{3}{8}\sec x \tan x + \frac{3}{8}\log|\sec x \tan x| + c$

C. $\frac{1}{4}\sec^3 x \tan x + \frac{5}{8}\sec x \tan x + \frac{1}{8}\log|\sec x \tan x| + c$

D. none

Answer: B

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108. Obtain reduction formula for

$I_n = \int \operatorname{cosec}^n x \, dx$, n being a positive integer, $n \geq 2$ and deduce the value

of $\int cosec^5 x \, dx$.

A. $-\dfrac{cosec^3 x cot x}{4} - \dfrac{3cosec x cot x}{8} + \dfrac{3}{8}\log|cosec x - cot x| + c$

B. $\dfrac{cosec^3 x cot x}{4} + \dfrac{3cosec x cot x}{8} - \dfrac{3}{8}\log|cosec x - cot x| + c$

C. $-\dfrac{cosec^3 x cot x}{4} - \dfrac{2cosec x cot x}{8} + \dfrac{3}{8}\log|cosec x - cot x| + c$

D. $-\dfrac{cosec^3 x cot x}{4} + \dfrac{2cosec x cot x}{8} - \dfrac{3}{8}\log|cosec x - cot x| + c$

Answer: A

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109. $\int cosec^6 x \, dx =$

A. $\dfrac{1}{5}cosec^4 x cot x - \dfrac{4}{15}cosec^2 x cot x - \dfrac{8}{15}cot x + c$

B. $-\dfrac{1}{5}cosec^4 x cot x - \dfrac{4}{15}cosec^2 x cot x - \dfrac{8}{15}cot x + c$

C. $\dfrac{1}{5}cosec^4 x cot x + \dfrac{4}{15}cosec^2 x cot x + \dfrac{8}{15}cot x + c$

D. none

Answer: B

EXERCISE 2 (SET-1)

1. $I: \int \dfrac{1 - x^4}{1 - x} dx = x + \dfrac{x^2}{2} + \dfrac{x^3}{3} + \dfrac{x^4}{4} + c$

$II : \int 1 + x + \dfrac{x^2}{2!} + \dfrac{x^3}{3!} + \dots . \, dx = e^x + c$

A. only I is true

B. only II is true

C. both I and II are true

D. neither I nor II true

Answer: 3

2. I : $\int \dfrac{1}{\cos x \sin^2 x} dx = \log \left| \dfrac{\tan(x)}{2} \right| + \sec x + c$

II $\int \dfrac{1}{\cos x + \sin^2 x} dx = \operatorname{cosec} x + \log|\sec x + \tan x| + c$

A. only I is true

B. only II is true

C. both I and II are true

D. neither I nor II true

Answer: 1

3. I : $\int \dfrac{(1+x)e^x}{\sin^2\left(xe^x\right)} dx = \cot\left(xe^x\right) + c$

II : $\int \dfrac{\sec x}{(\sec x + \tan x)^2} dx = \dfrac{1}{2(\sec x + \tan x)^2} + c$

A. only I is true

B. only II is true

C. both I and II are true

D. neither I nor II true

Answer: 4

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4. I : $\int \dfrac{dx}{\sqrt{x}(x+9)} = f(x) + c$ constnat, then $f(x) = \dfrac{2}{3}\tan^{-1}\left(\dfrac{\sqrt{x}}{3}\right)$

II : $\int \dfrac{dx}{(x+100)\sqrt{x+99}} = f(x) + c \Rightarrow f(x) = 2\tan^{-1}\sqrt{x+99}$

A. only I is true

B. only II is true

C. both I and II are true

D. neither I nor II true

Answer: 3

EXERCISE 2 (SET-2)

1. If $\int \tan^4 x\,dx = A\tan^3 x + B\tan x + Cx + c$ then the descending order of A,B,C is

   A. A,B,C

   B. B,C,A

   C. C,A,B

   D. C,B,A

Answer: 3

2. If $\int \dfrac{x^3 + 1}{x^2 + 1} dx = Ax^2 + B\tan^{-1}x + C\log\left(x^2 + 1\right) + c$ then the assecdning order of A,B,C is

A. A,B,C

B. B,C,A

C. C,A,B

D. C,B,A

Answer: 3

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3. It $\int \dfrac{3x - 2}{(x - 1)(x + 2)(x - 2)} dx = A\log|x - 1| + B\log|x + 2| + C\log|x - 3| + C$

`then the ascending order of A,B,C is

A. A,B,C

B. B,A,C

C. C,A,B

D. C,B,A

Answer: 2

---

4. If $\int x^2 e^{2x} dx = e^x \left(Ax^2 + Bx + C \right) + c$ then the ascending order of A,B,C is

A. A,B,C

B. B,C,A

C. C,A,B

D. C,B,A

Answer: 2

1. Match the following.

I. $\int \sec^2 x \cosec^2 dx$ $a \Big) x + c$

II. $\int \tan^2 x \cot^2 x dx =$ $b \Big) \tan x - x + c$

III. $Int \sin^2 x \sec^2 x dx =$ $c \Big) - \cot x - x + c$

IV. Int cos^(2) x "cosec"^(2) x dx= " " d) tan x-cot x+c`

    A. a,b,c,d

    B. b,c,a,d

    C. d,a,b,c

    D. a,b,c,a

Answer: 3

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2. Match the following.

I. $\int \dfrac{\sin x}{1 + \cos 2x} dx =$ a) $\tan x - \dfrac{1}{2}x + c$

II $\int \dfrac{1}{1 - \cos 2x} dx =$ b) $- \cot x - \dfrac{1}{2}x + c$

III. $\int \dfrac{1 + \cos^2 x}{1 - \cos 2x} dx =$ c) $\dfrac{1}{2}\sec x + c$

IV. $\int \dfrac{1 + \sin^2 x}{1 + \cos 2x} dx =$ - d) $\dfrac{1}{2}\cot x + c$

A. a,b,c,d

B. b,c,a,d

C. d,a,b,c

D. a,b,c,a

Answer: 4

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3. Match the following.

I. $\int \dfrac{1}{\sqrt{4-x^2}}\,dx =$ $a\Big)\dfrac{1}{2}\sinh^{-1}\dfrac{x}{2}+c$

II. $\int \dfrac{1}{\sqrt{4+x^2}}\,dx =$ $b\Big)\dfrac{\cosh^{-1}(x)}{2}+c$

III. $\int \dfrac{1}{x^2-4}\,dx =$ $c\Big)\sin^{-1}\dfrac{x}{2}+c$

A. a,b,c

B. b,c,a

C. c,a,b

D. a,c,b

Answer: 3

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4. Match the following.

I. $\int \dfrac{1}{9+x^2}\,dx =$ a) $\dfrac{1}{6}\log\left|\dfrac{3+x}{3-x}\right| + c$

II. $\int \dfrac{1}{x^2-9}\,dx =$ b) $\dfrac{1}{6}\log\left|\dfrac{3-x}{3+x}\right| + c$

III. $\int \dfrac{1}{9-x^2}\,dx =$ c) $\dfrac{1}{3}\tan^{-1}\dfrac{x}{3} + c$

A. a,b,c

B. b,c,a

C. c,a,b

D. a,c,b

Answer: 3

EXERCISE 2 (SET-4)

1. A: $\int \dfrac{1}{3 + 2\cos x} dx = \dfrac{2}{\sqrt{5}} \tan^{-1}\left(\dfrac{1}{\sqrt{5}}\tan\dfrac{x}{2}\right) + c$

R: If $a > b$ then $\int \dfrac{dx}{a + b\cos x} = \dfrac{2}{\sqrt{a^2 - b^2}} \tan^{-1}\left[\dfrac{\sqrt{a - b}}{a + b}\tan\dfrac{x}{2}\right] + c$

A. Both A and R are true and R is the correct explanation of A

B. Both A and R are true but R is not correct explanation of A

C. A is true but R is false

D. A is false but R is true

Answer: 1

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2. A: $\int \dfrac{1}{5 + 4\sin x} dx = \dfrac{2}{3} \tan^{-1}\left(\dfrac{4 + 5\tan(x/2)}{3}\right) + c$

R : If $a > 0, a > b$, then $\int \dfrac{dx}{a + b\sin x} = \dfrac{2}{\sqrt{a^2 - b^2}} \tan^{-1}\left[\dfrac{b + a\tan(x/2)}{\sqrt{a^2 - b^2}}\right] + c$

A. Both A and R are true and R is the correct explanation of A

B. Both A and R are true but R is not correct explanation of A

C. A is true but R is false

D. A is false but R is true

Answer: 1

3. A: $\int e^x \left(\dfrac{1 + x\log x}{x} \right) = e^x \log x + c$

R: $\int e^x [f(x) + f'(x)] dx = e^x f(x) + c$

A. Both A and R are true and R is the correct explanation of A

B. Both A and R are true but R is not correct explanation of A

C. A is true but R is false

D. A is false but R is true

Answer: 1

4. Observer the following statements :

A : $\int \dfrac{x^2 - 1}{x^2} e^{\frac{x^2+1}{x}} dx = e^{\frac{x^2+1}{x}} + c$

R: $\int f'(x)e^{f(x)} dx = f(x) + c$

Then which of the following is true ?

A. Both A and R are true and R is the correct explanation of A

B. Both A and R are true but R is not correct explanation of A

C. A is true but R is false

D. A is false but R is true

Answer: 3