MATHS

BOOKS - PATHFINDER MATHS (BENGALI ENGLISH)

INDEFINITE INTEGRATION

Question Bank

1. Evaluate : $\int(\sqrt{3}\sin x - \cos x)\,dx$

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2. Evaluate : $\int \sec^2(3x+5)\,dx$

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3. Find $\int \cos 6x \sqrt{1+\sin 6x} dx$

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

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5. Evaluate $\int \frac{\sin(\ln x)}{x} dx$

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6. $\int ((x-a)(b-x))dx$

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7. Evaluate : $\int \frac{dx}{(x+3)^{\frac{15}{16}}(x-4)^{\frac{17}{16}}}$

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8. Evaluate: $\int \frac{dx}{\left(x+\sqrt{x^2-4}\right)^{\frac{5}{3}}}$

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9. Evaluate : $\int \sqrt{4-x}\Big)dx$

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10. Evaluate: $\int (\cos x - \sin x)(3+4\sin 2x)dx$

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11. Evaluate: $\int \frac{\sqrt{x}}{\sqrt{x^3+a^3}}dx$

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12. Evaluate: $\int \frac{\sin x+\cos x}{9+16\sin 2x}dx$

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13. Evaluate: $\int x\frac{dx}{1+x^4}$

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14. Evaluate: $\int\left(x^4+1+5x^2\right)dx$

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15. Find $\int \frac{\sin 2x \cos 2x dx}{\sqrt{9 - \cos^4(2x)}}$

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16. Evaluate: $\int \frac{14}{\sin^2 x + \cos^4 x} dx$

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17. Evaluate: $\int \frac{dx}{2 \sin x + \sec x}$

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18. Evaluate: $\int x^2 \sin x dx$

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19. Evaluate: $\int \sin^{-1}\left(\frac{2x+2}{\sqrt{4x^2+8x+13}}\right)dx$

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20. Evaluate: $\int Inx dx$

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

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

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23. Evaluate: $\int \frac{\left(\sqrt{x^2+1}\right)\{In(x^2+1)-2Inx\}}{x^4}dx$

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24. Evaluate: $\int \frac{dx}{(x-1)(x-3)}$

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

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26. Find $\int \frac{x^4 dx}{(x-1)(x^2+1)}$

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27. Evaluate: $\int \frac{x^4 dx}{(x-1)(x+1)^2}$

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28. `int (x^4 - 3x^2 - 3x -2)/(x^3 - x^2 - 2x) dx

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29. Find $\int \frac{x^2+x+1}{(x+2)(x^2+1)} dx$

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

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31. Evaluate: $\int \frac{dx}{(x-b)^3(x-a)^2}$

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32. Evaluate: $\int \frac{dx}{\sqrt{-x^2+4x+6}}$

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33. Evaluate: $\int \sqrt{3x^2-6x+10}dx$

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34. Evaluate: $\int \frac{3x+5}{\sqrt{x^2+4x+3}}dx$

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35. Evaluate: $\int \frac{dx}{(x+2)\sqrt{x^2+4x+8}}$

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36. Evaluate: $\int \frac{4x+7}{(x+2)\sqrt{x^2 4x+8}}$

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37. Evaluate: $\int \frac{2x^2+7x11}{(x+2)\sqrt{x^2+4x+8}}$

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38. Evaluate: $\int \frac{xdx}{\sqrt{x^2-1}}\Big)$

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39. Evaluate: $\int \frac{dx}{x^2+5}$

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

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41. Evaluate: $\int x^{-\frac{2}{3}}\left(1+x^{\frac{1}{3}}\right)^{\frac{1}{4}}dx$

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42. $\int x^{-11}\left(1+x^4\right)^{-\frac{1}{2}}dx$

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43. Evaluate: $\int \frac{2+3\cos\theta}{\sin\theta+2\cos\theta+3}dth\eta$

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44. Evaluate: $\int \frac{3\sin x + 2\cos x}{3\cos x + 2\sin x} dx$

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45. Evaluate: $\int \sin^3 x \cos^5 x dx$

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46. Evaluate: $\int \sin^3 x \cos^5 x dx$

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47. Evaluate: $\int \sin^{-\frac{11}{3}} x \cos^{\frac{5}{3}} x dx$

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48. If $I_n = \int \sin^n x dx then n I_n - (n-1) I_{n-2} = f(x) + c$ where f(x) =

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49. $\int \frac{a^x - b^x}{a^x b^x} dx$

A. $\left(\frac{a}{b}\right)^x + x + c$

B. $(ab)^x - x + c$

C. $a^x + b^x + x + c$

D. none of these

Answer: D

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50. $\int (\tan x + \cot x) dx$

A. log (c tan x)

B. log (sin x + cos x) + c

C. log (cx)

D. none of these

Answer: A

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51. Evaluate $\int(\cos 2x - \sin 4x)dx$

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52. $\int\frac{1-\cos 2x}{1+\cos 2x}dx$ =

A. tan x + x + c

B. tan x - x + c

C. sinx - x + c

D. sinx + x + c

Answer: B

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53. $\int \frac{4+5\sin x}{\cos^2 x} dx$ =

A. 4 tan x - sec x + c

B. 4 tan x + 5 sec x + c

C. 9 tan x + c

D. none of these

Answer: B

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54. Evaluate $\int \frac{\cos x}{1+\sin x} dx$

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55. $\int \frac{\left(\sin^{-1} x\right)^2}{\sqrt{1-x^2}} dx$

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56. Evaluate $\int \frac{dx}{e^x + e^{-x}} dx$

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57. Evaluate $\int \sqrt{\frac{a+x}{a-x}} dx$

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58. $\int \frac{dx}{(1+x^2)\sqrt{p^2 + q^2\left(\tan^{-1} x\right)^2}}$

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59. $\int \frac{x \sin^{-1} x}{\sqrt{1-x^2}} dx$

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60. $\int (\log x)^2 dx$

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61. $\int \sin^{-1} 2x dx$

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62. $\int e^x \left(\frac{\sin x + \cos x}{\cos^2 x} \right) dx$

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63. $\int x^2 \tan^3 (x^3) \sec^2 (x^3) dx$

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64. $\int \frac{dx}{(x-3)\sqrt{x+7}}$

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65. $\int \frac{dx}{(2+x)\sqrt{1+x}}$ =

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66. Find the value of $\int \frac{\sqrt{1+x^2}}{1-x^2} dx$

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67. Prove that $\int \frac{dx}{(x^2-4)\sqrt{x+1}} = 2\int \frac{dt}{(t^2-3)(t^2+1)}$ where $x + 1 = t^2$

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68. $\int \frac{dx}{5+4\cos x}$

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69. Evaluate $\int \frac{dx}{\sin x \cos x}$

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70. Evaluate $\int \frac{dx}{\sqrt{1+\sin x}}$

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71. Find the reduction for `I_m,n = int (sin x)^m (cos x)^n dx

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72. Find the reduction formula for $I_n = \int (a^2 - x^2)^n dx$

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73. $\int \frac{dx}{3+\sin^2 x}$=?

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74. $\int \frac{\sin x}{\sin x - \cos x} dx$

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75. $\int \frac{\sin x}{a \sin x + b \cos x} dx$

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76. $\int \frac{dx}{1+e^{-x}}$=?

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

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

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

C. x^x + c

D. None of these

Answer: A

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78. If $\int \frac{x+\left(\cos^{-1}3x\right)^2}{\sqrt{1-9x^2}}dx = A\sqrt{1-9x^2}+B\left(\cos^{-1}3x\right)^3$ + c then A, B are respectively

A. -1/9 , -1/9

B. 1/9 , 1/9

C. 1/3 , -1/9

D. None of these

Answer: A

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79. $I = \int \frac{1}{(x+a)^{\frac{8}{7}}(x-b)^{\frac{6}{7}}} dx$ =

A. $\frac{7}{a+b}\left(\frac{x-b}{x+a}\right)^{\frac{1}{7}} + c$

B. $\frac{7}{a-b}\left(\frac{x-b}{x+a}\right)^{\frac{1}{7}} + c$

C. $\frac{7}{a-b}\left(\frac{x+a}{x-b}\right)^{\frac{1}{7}} + c$

D. None of these

Answer: A

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80. $\int \sqrt{\sec x - 1} dx$ is equal to

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

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

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

D. None of these

Answer: C

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81. If $\int\frac{dx}{x\sqrt{5x^2-3}}$= K (gof)(x) + c`, then

A. a) g(x) =$\tan^{-1}x$, $f(x)=\sqrt{\frac{5}{3}x^2-1}$, $K=\frac{1}{\sqrt{3}}$

B. b) $g(x)=\sqrt{\frac{5}{3}x^2-1}$, $f(x)=\tan^{-1}x$, $K=\frac{1}{\sqrt{3}}$

C. c) $g(x)=\tan^{-1}x$, $f(x)=\frac{1}{2}\sqrt{5x^2-3}$, $K=\frac{1}{\sqrt{5}}$

D. d) None of these

Answer: A

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82. If $f(x) = \dfrac{x^2}{1+x^2}$ and g(x) = sin x then $\int (\log)(x)\cos x dx =$

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

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

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

D. None of these

Answer: A

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

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

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

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

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

Answer: B

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84. $\int\left(x^2 + 4x + 2\right)$ dx is

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85. $\int\frac{dx}{x(x^{1000}+1)} = A\left[In|x|^{1000} - In\left|x^{1000}+1\right|\right]$ + c then A is

A. 1/1000

B. 1000

C. 999

D. None of these

Answer: A

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86. $\int \frac{(x^2-1)dx}{(x^4+3x^2+1)\tan^{-1}\left(\frac{x^2+1}{x}\right)} = k\log\left|\tan^{-1}\left(\frac{x^2+1}{x}\right)\right| + c$

A. 2

B. 1

C. -1

D. None of these

Answer: B

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87. If $\int \frac{\sqrt{\cot x}}{\sin x \cos x}dx = A\sqrt{\cot x} + B$ then A =

A. 1

B. 2

C. -1

D. -2

Answer: D

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88. $\int [f(x)g(x) - f(x)g(x)]dx$ is

A. f/g'

B. f'g - fg'

C. fg' - f'g

D. None of these

Answer: C

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89. Evaluate: $\int \frac{(x^2-1)dx}{(x^4+x^2+1)}$ is =?

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90. $\int \frac{e^x(1+x)}{\cos^2(xe^x)}$ dx is

A. $\tan(xe^x)$ + c

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

C. $\sqrt{\tan(xe^x)}+c$

D. None of these

Answer: A

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91. $\int \frac{dx}{(2+x)\sqrt{1+x}}$ =

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

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

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

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

Answer: A

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92. $\int\left[In(Inx)+\frac{1}{(Inx)^2}\right]dx$ is

A. $xIn(Inx)+\frac{x}{Inx}+c$

B. $In(Inx)+\frac{x}{Inx}+c$

C. $xIn(Inx)-\frac{x^2}{Inx}+c$

D. $xIn(Inx)-\frac{x}{Inx}+c$

Answer: D

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93. If $\int g(x)dx = g(x)$, then $\int g(x)\{f(x) - f'(x)\}dx$ is equal to

A. g(x)(f(x) + f'(x)) + c

B. g(x)(f(x) - f'(x)) + c

C. g(x)(f(x) f'(x)) + c

D. None of these

Answer: A

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94. If $I_n = \int \sin^n x dx then n I_n - (n-1)I_{n-2} = f(x) + c$ where f(x) =

A. $\sin^{n-1} x \cos x$

B. $\cos^{n-1} x \sin x$

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

D. $-\cos^{n-1} x \sin x$

Answer: C

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95. Plot the function $f(x) = \max\{x, x^2, x^3\}$

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96. If $\int \frac{dx}{x^4 + x^3}$ is equal to $\log\left|\frac{x}{x+1}\right| + \frac{1}{x} + \frac{k}{x^2} + c$

A. 44198

B. -0.5

C. 2

D. None of these

Answer: B

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

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98. If $\int \frac{\cos 4x + 1}{\cot x - \tan x}$ dx = A cos 4x + B, then

A. A = -1/2

B. A = -1/8

C. A = -1/4

D. None of these

Answer: B

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99. If $\int e^x(\tan x - \log\cos x)dx = f(x)\log\sec x$ then range of f(x) is

A. $(-\infty, \infty)$

B. $(0, \infty)$

C. $(0, -\infty)$

D. None of these

Answer: B

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100. If $\int \frac{bx\cos 4x - a\sin 4x}{x^2}$ dx = $\frac{a\sin 4x}{x}$ + c then a, b may be

A. a = 2 , b = 2

B. a = 1, b = 4

C. a = 5 , b = 2

D. a = 3 , b = 1/4

Answer: B

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101. if $\int \frac{e^{6\log x} - e^{4\log x}}{e^{3\log x} - e^{2\log x}} dx = \phi(x),$ then $\phi'(1)$ is

A. 44198

B. -1

C. 1

D. None of these

Answer: C

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102. If $\int \frac{dx}{x^6 + x^4} = \tan^{-1} x + \frac{1}{x} + \frac{k}{x^3} + c$, then value of k is

A. 1

B. -0.3333...

C. 44201

D. 44199

Answer: B

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103. $\int \frac{f(x)\phi'(x) - \phi(x)f'(x)}{f(x)\phi(x)}\{\log\phi(x) - \log f(x)\}dx$ is

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

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

C. $\frac{\phi(x)}{f(x)}\log\left[\frac{\phi(x)}{f(x)}\right] + c$

D. None of these

Answer: B

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

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

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

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

D. None of these

Answer: A

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105. If $\int \frac{dx}{(x+1)^3+(x+1)^2}$ is $k\left[t-\frac{t^2}{2}+\frac{t^3}{3}-In|t|\right]+c$ where $t^5=x+1$, then k is

A. -2

B. -3

C. -8

D. 6

Answer: D

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106. $\int \frac{\cos^3 x + \cos^5 x}{\sin^2 x + \sin^4 x} dx$ equals

A. $\sin x - 6\tan^{-1}(\sin x) + c$

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

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

D. None of these

Answer: D

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107. $\int \frac{\sec x dx}{[\sin(2x+\alpha) + \sin\alpha]^{\frac{1}{2}}}$ is

A. $2\sec\alpha\sqrt{\tan x\cos\alpha + \sin\alpha} + c$

B. $\sqrt{2}\sec\alpha\sqrt{\tan x\cos\alpha + \sin\alpha} + c$

C. $\frac{1}{\sqrt{2}}\sec\alpha\sqrt{\tan x\cos\alpha+\sin\alpha}+c$

D. None of these

Answer: B

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108. If $\int\frac{\cos^4 x dx}{\sin^3 x\left(\sin^5 x+\cos^5 x\right)^{\frac{3}{5}}}$ is equal to $-\frac{1}{2}\left(1+\cot^5 x\right)^m$ then m is

A. 44230

B. 44232

C. 0.4

D. -0.6666666667

Answer: B

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109. Let f(x) = x + sin x . Suppose 'g' denotes the inverse function of 'f' . The value of $g'\left(\frac{\pi}{4}+\frac{1}{\sqrt{2}}\right)$ has the value equal to

A. $\sqrt{2}-1$

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

C. $2-\sqrt{2}$

D. $\sqrt{2}+1$

Answer: C

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110. $I=\int\frac{1}{\cos^4 x}dx$ is equal to

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

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

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

D. None of these

Answer: D

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

A. $-7\log|x-1| - \frac{6}{x-1} + 7\log|x-2| + c$

B. $-7\log|x-1| + c$

C. $-7\log|x-1| + \frac{6}{x-1} + 7\log|x-2| + c$

D. None of these

Answer: C

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

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

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

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

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

Answer: A

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

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114. $I=\int\frac{x+x^{\frac{2}{3}}+x^{\frac{1}{6}}}{x\left(1+x^{\frac{1}{3}}\right)}dx$ is equal

A. $\frac{3}{2}x^{\frac{2}{3}}+6\tan^{-1}\left(x^{\frac{1}{6}}\right)+c$

B. $\frac{3}{2}x^{\frac{2}{3}}-6\tan^{-1}\left(x^{\frac{1}{6}}\right)+c$

C. $\frac{3}{2}x^{\frac{2}{3}} + \tan^{-1}\left(x^{\frac{1}{6}}\right) + c$

D. None of these

Answer: A

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

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

B. $\frac{\sqrt{2x^4 - 2x^2 + 1}}{x^3} + c$

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

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

Answer: D

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116. The value of the integral $\int e^{\sin^2 x}\left(\cos x+\cos^3 x\right)\sin x dx$ is

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

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

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

D. $e^{\sin^2 x}\left(2\cos^2 x+3\sin^2 x\right)+c$

Answer: A

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117. $\int x|x|dx=$

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

B. $\frac{x^3|x|}{3}+c$

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

D. None of these

Answer: B

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118. If $f(x) = x^2$, then $\triangle^2 f(x)$ is

A. x + c'

B. 2x + c'

C. x/2 + c'

D. $x^2 + c'$

Answer: C

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119. Integral of $\sqrt{1 + 2\cot x(\cot x + \cos ecx)}$ w.r.t.x, is

A. 2 In $\left|\frac{\cos x}{2}\right|$ + c

B. 2 In $\left|\frac{\sin x}{2}\right|$ + c

C. 1/2 In $\left|\frac{\cos x}{2}\right|$ + c

D. In sin x - In (cosec x - cot x) + c

Answer: B

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120. $\int \frac{e^{2001x} + e^{1999x}}{e^x + e^{-x}} dx$ is

A. $\frac{e^{2000x}}{2000}$ + c

B. $\frac{e^{2000x}}{2001}$ + c

C. $\frac{e^{2000x}}{2000}$ + c

D. $\frac{e^{2001x}}{2001}$ + c

Answer: C

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121. The primitive of the function f(x) $= x|\cos x|$, when $x \in \left(\frac{\pi}{2}, \pi\right)$ is

A. x sin x + cos x + c

B. x cos x + sin x + c

C. -x sin x - cos x + c

D. x cosx - sin x + c

Answer: C

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122. If $\int \tan^4 x dx = a\tan^3 x + b\tan x + \phi(x)$ then

A. a = 1/3

B. b = 1

C. $\phi(x) = x + c$

D. b = -1

Answer: A::C::D

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123. If $\int \frac{\sin x}{\sin(x-\alpha)} dx = Ax + B \log \sin(x-\alpha) + c$

A. $A = \sin \alpha$

B. $B = \cos \alpha$

C. $A = \cos \alpha$

D. $B = \sin \alpha$

Answer: C::D

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124. If $\int \frac{4e^x + 6e^{-x}}{9e^x - 4e^{-x}} dx = Ax + B \log_e \left(9e^{2x} - 4\right) + c$ then

A. A = 3/2

B. B = 35/36

C. c is indefinite

D. A + B = -19/36

Answer: B::C::D

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125. If $\int x \log\left(1+x^2\right) dx = \phi(x)\log\left(1+x^2\right) + \psi(x) + c$ then

A. $\phi(x) = \frac{1+x^2}{2}$

B. $\psi(x) = \frac{1+x^2}{2}$

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

D. $\phi(x) = -\frac{1+x^2}{2}$

Answer: A::C

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

A. A + B = 0

B. AB = 1

C. A : B = 2

D. None of these

Answer: A

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127. If $\int \frac{xe^x}{\sqrt{1+e^x}}dx = f(x)\sqrt{1+e^x} - 2Ing(x) + c$, then

A. f(x) = x - 1

B. g(x) = $\frac{\sqrt{1+e^x}-1}{\sqrt{1+e^x}+1}$

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

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

Answer: B::D

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128. If $I = \int \frac{\sin x + \sin^3 x}{\cos 2x} dx = A \cos x + B \log|f(x)| + c$, then find A, B, f(x).

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

B. A = 1/2 , $B = -\frac{3}{4}\sqrt{2}$

C. A = -1/2 , $B = \frac{3}{\sqrt{2}}, f(x) = \frac{\sqrt{2}\cos x + 1}{\sqrt{2}\cos x - 1}$

D. A = 1/2 , $B = -\frac{3}{\sqrt{2}}, f(x) = \frac{\sqrt{2}\cos x + 1}{\sqrt{2}\cos x - 1}$

Answer: B::D

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129. If $\int \frac{xe^x}{\sqrt{1+e^x}} dx = f(x)\sqrt{1+e^x} - 2Ing(x) + c$, then

A. $g\left(\frac{\pi}{4}\right) = \frac{3}{2}$

B. g(x) is continious for all x

C. $g\left(\frac{\pi}{4}\right) = -\frac{15}{8}$

D. g(x) is non differentiable at infinitely many points

Answer: C::D

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130. The value of $\int_0^x \frac{(t-|t|)^2}{1+t^2} dt$ is equal to

A. $4\left(x - \tan^{-1} x\right)$, if $x < 0$

B. 0 , if $x > 0$

C. $In\left(1+x^2\right)$, if $x > 0$

D. None of these

Answer: A::B

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131. $\int \frac{dx}{(x+1)(x+2)} = A\log(x+1) + B\log(x+2) + c$ where

A. A + B = 0

B. AB = 0

C. A/B = -1

D. None of these

Answer: C

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132. Let f(x) = $\frac{3}{3x^2+9}$ and g(x)=$\frac{x^2}{3x^2+9}$

$\int (f(x) + g(x))dx = ?$

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133. Let f(x) = $\frac{3}{3x^2 - 9}$ and g(x)=$\frac{x^2}{3x^2 - 9}$

$\int$ (g(x) - f(x)) dx is equal to ?

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134. If $i_{m-2,n+2} = \int \sin^{m-2} x \cos^{n+2} x dx$ and $I_{m,n} = -\frac{\sin^{m-1} x \cos^{n+1} x}{n+1} + f(m,n) I_{m-2,n+2}$, then f(2,3) is equal to

A. 44198

B. 44199

C. 44200

D. 44201

Answer: C

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135. If $I_n = \int x \sin^n x dx$ and $I_n = -\frac{x \sin^{n-1} x \cos x}{n} + \frac{\sin^n x}{n^2} + f(n) I_{n-2}$, then the value of f(n) is equal to

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

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

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

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

Answer: A

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136. Match List - I with List-II

Let the functions defined in List - I have domain $(-\pi/2, \pi/2)$

List - I		List - II	
(1)	$x + \sin x$	(P)	increasing
(2)	$\sec x$	(Q)	decreasing
(3)	e^{-x}	(R)	neither increasing nor decreasing

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137. Match List - I with List-II

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(3)	e^{-x}	(R)	neither increasing nor decreasing

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138. If $\int x \frac{dx}{\sqrt{7x-10-x^2}^3} = \frac{\lambda(7x-20)}{\sqrt{7x-10-x^2}} + c$, then the value of $lamba$ must be

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139. If $\int \frac{dx}{1+\sin x} = \tan\left(\frac{x}{2}+a\right) + b$ then the value of $-\frac{16a}{\pi}$ must be

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140. If

$$\int \sin^{-1}\left(\frac{2x+2}{\sqrt{4x^2+8x+13}}\right)dx = (x+1)\tan^{-1}\left(\frac{2x+2}{3}\right) + \lambda In\left(4x^2+8\right.$$

, then the value of -4λ must be

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141. If

$$\int \left(x^9+x^6+x^3\right)\left(2x^6+3x^3+6\right)^{\frac{1}{3}}dx = \frac{1}{a}\left(2x^9+3x^6+6x^3\right)^{\frac{4}{3}} + c \quad ,$$

then the value of a/4 must be

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142. If $\int(\sqrt{\tan x}+\sqrt{\cot x})dx = a\tan^{-1}\left(\frac{\tan x-1}{\sqrt{b\tan x}}\right)+c$, then the value of $\sqrt{a^4+b^5}$ must be

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143. Evaluate : $\int\frac{dx}{7x-10-x^2}$

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144. Evaluate : $\int\frac{xdx}{\sqrt{1+x^4}}$

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145. Evaluate : $\int \frac{dx}{\sqrt{e^{5x}} \cdot \sqrt[4]{e^{2x}+e^{-2x}}^3}$

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146. Evaluate : $\int_0^{\log 5} \frac{e^x(e^x-1)^{\frac{1}{2}}}{e^x+3}dx$

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147. Evaluate : $\int_1^2 \left(e^{x^2}\right)dx = a$, then find the value of $\int_e^{e^4} \sqrt[2]{\log_e x}dx$

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148. $\int \frac{1}{\sin(x-a)\cos(x-b)}dx$

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149. The value of $\int_0^3 [x]dx$, where $[x]$ is greatest integer function is.....

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150. Evaluate: $\int x^2 \sin x dx$

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151. Evaluate : $\int \sqrt[3]{\tan x} dx$

Watch Video Solution

152. If $I_{m,n} = \int \cos^m x \cdot \cos nx \cdot dx$ show that $(m+n)I_{m,n} = \cos^m x \cdot \sin nx + mI_{m-1,n-1}$

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153. $\int \frac{\cos\sqrt{x}}{\sqrt{x}} dx$ =

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

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

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

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

Answer: C

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154. $\int \frac{\tan(\log x)}{x} dx$ =?

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

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

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

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

Answer: C

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155. $\int \frac{e^x dx}{e^{2x}+1}$=

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

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

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

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

Answer: C

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156. $\int \frac{2\sin^{-1} x}{\sqrt{1-x^2}} dx$=

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

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

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

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

Answer:

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157. $I = \int \frac{\log_e (\log_e x)}{x (\log_e x)} dx$ is equal to

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

B. $\frac{1}{2} (\log_e \log_e x)^2 + c$

C. $\frac{1}{2} \log_e \log_e x + c$

D. $(\log_e x)^2 + c$

Answer: B

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158. $I = \int \frac{\left(10x^9 + 10^x \log_e 10\right)}{\left(x^{10} + 10^x\right)} dx$ is equal to

A. $10^x + x^{10} + c$

B. $10^x - x^{10} + c$

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

D. $\log_e \left|10^x + x^{10}\right| + c$

Answer: D

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159. $\int \frac{dx}{x \log x \log(\log x)}$ is equal to

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

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

C. $\log|\log(\log(1/x))| + c$

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

Answer: A

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160. $\int \frac{xdx}{\sqrt{1-x^3}} = ?$

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161. $I = \int \frac{e^x}{(e^x+1)^{1/4}} dx$ is equal to

A. (e^(2x)-e^(-2x))/2+c`

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

C. (e^x-e^(-2x))/2+c`

D. $\frac{4}{3}(e^x+1)^{3/4}+c$

Answer: D

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162. $I = \int \frac{\cos 4x + 1}{\cot x - \tan x} dx$ is equal to ?

A. `

B.

C.

D.

Answer:

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163. $\int \frac{(x^2 - 1)dx}{(x^4 + 3x^2 + 1)\tan^{-1}\left(\frac{x^2+1}{x}\right)} = k \log \left| \tan^{-1}\left(\frac{x^2 + 1}{x}\right) \right| + c$

A. 1

B. 2

C. 3

D. 5

Answer: A

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164. If $I = \int \frac{\sin x - \cos x}{(\sin x + \cos x)\sqrt{\sin x \cos x + \sin^2 x \cos^2 x}} dx = \frac{1}{4} \cos ec^{-1}(g(x)) +$, then

A. g(x)=1+sin2x

B. g(x)=1-sin2x

C. g(x)=1+cos2x

D. $-1 \leq g(x) \leq 1$

Answer: A

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165. $\int x^3 e^{x^2} dx$=?

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

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

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

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

Answer: C

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166. $\int x\tan^{-1}x dx=$

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

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

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

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

Answer: A

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167. $\int \frac{\sin x}{1+\cos x} dx$= ?

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168. $I = \int (\log_e x)^2 dx$ is equal to

A. $x \log_e x(\log_e x + 2) + c$

B. $x \log_e x(2 \log_e x + 1) + c$

C. $x\left[(\log_e x)^2 - 2(\log_e x) + 2\right] + c$

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

Answer: C

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169. $I = \int \sin^{-1}\left(\frac{2x}{1+x^2}\right) dx$ is equal to

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

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

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

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

Answer: A

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

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

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

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

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

Answer: A

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171. $I = \int \sqrt{1 + 2\tan x(\sec x + \tan x)}dx$ is equal to

A. $\log_e \left|\sec^2 x + \tan x \sec x\right| + c$

B. $\log_e |1 + \tan x(\sec x + \tan x)| + c$

C. $\log_e |\sin x(\sec x - \tan x)| + c$

D. $\log_e \left|\sec x + \tan^2 x\right| + c$

Answer: A

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172. $\int \tan^2 x dx$ =?

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173. $\int \left(In(1 + \cos x) - x\tan\left(\frac{x}{2}\right)\right)dx$ is equal to

A. $xIn(1+\cos x)+c$

B. $xIn(1+\sec x)+c$

C. $x^2In(1+\cos x)+c$

D. $xIn\tan x+c$

Answer: A

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174. $I=\int\frac{\left(\sin^8 x-\cos^8 x\right)}{1-2\sin^2 x\cos^2 x}dx$ is equal

A. sin2x+c

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

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

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

Answer: C

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

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

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

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

D. none of these

Answer: A

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176. $\int \frac{dx}{\sqrt{x}+x}$

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

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

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

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

Answer: A

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177. $\int\sqrt{\frac{x}{1+x^3}}dx$ is equal to ?

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178. $\int\frac{\cos 2\theta}{(\sin\theta+\cos\theta)^2}d\theta$ is equal to

A. $\frac{-1}{\sin\theta+\cos\theta}+c$

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

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

D. $\log(\sin\theta+\cos\theta)^2+c$

Answer: B

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179. If $\int \frac{(1-x^7)}{x(1+x^7)}dx = P\log|x| + Q\log|x^7+1| + c$

A. 7P+2Q=1

B. 7P-2Q=1

C. 7P+2Q=0

D. 2P+7Q=0

Answer: D

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180. If $\int f(x)\cos x dx = \frac{1}{2}f^2(x) + c$ then f(x) can be

A. x

B. 1

C. cosx

D. sinx

Answer: D

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181. $I = \int \frac{dx}{1+e^x} dx$ is equal to

A. $\log_e \left| \frac{1+e^x}{e^x} \right| + c$

B. $\log_e \left| \frac{e^x}{1+e^x} \right| + c$

C. $\log_e |(e^x)(1+e^x)| + c$

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

Answer: B

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182. $I = \int \sec^{2/3} x \cos ec^{4/3} x dx$ is equal to

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

B. $-3\cot^{1/3} + c$

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

D. $3\cot^{1/3} + c$

Answer: B

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

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

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

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

D. $\cos^{-1}(x - 1) + c$

Answer: C

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

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

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

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

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

Answer: C

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185. The value of the integral $\int \frac{\sin\left(\frac{x}{2}\right)}{\sqrt{1+\sin\left(\frac{x}{2}\right)}} dx$ can be

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186. The value of the integral $\int \frac{\cos 7x - \cos 8x}{1 + 2\cos 5x} dx$ can be

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

B. $\frac{\sin 5x}{5} + \frac{\cos 5x}{4} + c$

C. $\frac{\cos x}{3} - \frac{\sin 4x}{2} + c$

D. sin2x-sin3x+c

Answer: A

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

A. $\frac{1}{2}\left\{\frac{1}{\sqrt{1-2x}} - \frac{1}{\sqrt{3-2x}}\right\} + c$

B. $\frac{1}{6}\left\{(1-2x)^{3/2} - (3-2x)^{3/2}\right\} + c$

C. $\frac{1}{6}\left\{(1-2x)^{3/2} + (3-2x)^{3/2}\right\} + c$

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

Answer: B

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188. $\int\left[\cos\left(2x-\frac{\pi}{4}\right)\right]^{-2}dx=$

A. $\frac{1}{2}\tan\left(2x-\frac{\pi}{4}\right)+c$

B. $\frac{1}{2}\cot\left(2x-\frac{\pi}{4}\right)+c$

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

D. $\tan\left(x+\frac{\pi}{4}\right)+c$

Answer: A

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189. $\int\left(\frac{x^2+\sin^2 x}{1+x^2}\right)\sec^2 x\,dx$ is equals

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

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

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

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

Answer: D

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

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191. $\int \frac{\sin^2 x - \cos^2 x}{\sin^2 x \cdot \cos^2 x} dx =$

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192. $\int \frac{dx}{x - x^3} =$

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

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

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

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

Answer: A

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193. $\int\frac{dx}{(x-2)^{7/8}(x+3)^{9/8}}$ equals

A. $\frac{8}{5}\left(\frac{x-2}{x+3}\right)^{1/8}+c$

B. $\frac{5}{8}\left(\frac{x-2}{x+3}\right)^{1/8}+c$

C. $\frac{5}{8}\left(\frac{x+3}{x-2}\right)^{1/8}+c$

D. $\frac{8}{5}\left(\frac{x+3}{x-2}\right)^{1/8}+c$

Answer: A

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194. The value of the integral $\int (x^2+x)\left(x^{-8}+2x^{-9}\right)^{1/10} dx$ is

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

B. $\frac{5}{6}(x+1)^{11/10}+c$

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

D. $\frac{1}{11}(x+1)^{11/10}+c$

Answer: A

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195. If

$$I=\int x\log_e\left(1+\frac{1}{x}\right)dx=p(x)\ln\left(1+\frac{1}{x}\right)+\frac{1}{2}x-\frac{1}{2},\ln(1+x)+c$$

then

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

B. p(x)=0

C. p(x)=1

D. p(x)=x/2

Answer: A

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196. If $\int \frac{2dx}{((x-5)+(x-7))\sqrt{(x-5)(x-7)}} = f(g(x)) + c,$

then

A. $f(x) = \sin^{-1} x, g(x) = \sqrt{(x-5)(x-7)}$

B. $f(x) = \sin^{-1} x, g(x) = (x-5)(x-7)$

C. $f(x) = \tan^{-1} x, g(x) = \sqrt{(x-5)(x-7)}$

D. $f(x) = \tan^{-1} x, g(x) = (x-5)(x-7)$

Answer: C

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197. The value of $\int \frac{1}{\sin\theta + \cos\theta} d\theta$ is equal to ?

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198. $\int \frac{x^3 dx}{1 + x^8}$=?

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

A. $2\sin x + \log|\sec x + \tan x| + c$

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

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

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

Answer: C

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200. $\int \frac{\sin^8 x - \cos^8 x}{1 - 2\sin^2 x \cos^2 x} dx$

A. sin2x+c

B. 1/2 sin2x+c

C. -1/2 sin2x+c

D. 2/3 sin2x+c

Answer: c

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201. $\int 2^x (f'(x) + f(x)\log 2) dx$ is

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202. $I = \int \cos^3(2\theta) d\theta$ is equal to

A. $\frac{1}{2}(\sec\theta\tan\theta)+\log_e\sqrt{\sec\theta+\tan\theta}+c$

B. $\frac{1}{4}(\sec 2\theta\tan 2\theta)+\frac{1}{2}\log_e\sqrt{\sec 2\theta+\tan 2\theta}+c$

C. $\frac{1}{4}(\sec^2 2\theta\sin 2\theta)+\frac{1}{2}\log_e\sqrt[4]{\sec 2\theta+\tan 2\theta}+c$

D. none of these

Answer: B::C

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203. $I=\int\frac{e^x(1+\sin x)}{1+\cos x}dx$ is equal to

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

B. $\frac{e^x}{\cot(x/2)}+c$

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

D. $\frac{e^x}{\tan(x/2)}+c$

Answer: A::B

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204. If $\int \sqrt{\frac{\cos x - \cos^3 x}{(1 - \cos^3 x)}} dx = f(x) + c$, then f(x) is equal to

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

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

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

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

Answer: C::D

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

A. $\frac{1}{n}\log_e\left|\frac{x^m}{x^m + 1}\right| + c$

B. $-\frac{1}{n}\log_e\left|\frac{x^m + 1}{x^m}\right| + c$

C. $\log_e\left|\frac{x^m}{x^m + 1}\right| + c$

D. none of these

Answer: A::B

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206. If $\int x \log(1+x^2)dx = A(x) \cdot \log(1+x^2) + B(x) + c$, then

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

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

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

D. $B(x) = -\frac{(1+x^2)}{2}$

Answer: A::D

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207. $\int \frac{dx}{\sin x + \sqrt{3}\cos x}$

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208. If $\int \frac{\sin x + \sin^3 x}{\cos 2x} dx = \lambda \cos x + \mu \log|f(x)| + c$, then

A. $\lambda = \frac{1}{2}, \mu = -\frac{1}{2}, f(x) = \frac{\sqrt{2}\cos x + 1}{\sqrt{2}\cos x - 1}$

B. $\lambda = \frac{1}{2}, \mu = -\frac{3}{4\sqrt{2}}, f(x) = \frac{\sqrt{2}\cos x - 1}{\sqrt{2}\cos x + 1}$

C. $\lambda = \frac{1}{2}, \mu = -\frac{3}{\sqrt{2}}, f(x) = \frac{\sqrt{2}\cos x + 1}{\sqrt{2}\cos x - 1}$

D. $\lambda = \frac{1}{2}, \mu = -\frac{3}{4\sqrt{2}}, f(x) = \frac{\sqrt{2}\cos x + 1}{\sqrt{2}\cos x - 1}$

Answer: B::D

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209. If $\int \frac{xe^x}{\sqrt{1+e^x}} dx = f(x)\sqrt{1+e^x} - 2Ing(x) + c$, then

A. $f(x) = \sqrt{1+e^x}$

B. $g(x) = \frac{\sqrt{1+e^x} - 1}{\sqrt{1+e^x} + 1}$

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

D. $e^x + 1$

Answer: A::B

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210. If $\int \sin(\log x)dx = f(x)(\sin g(x) - \cosh(x)) + c$, then

A. $\lim_{x \to 2} f(x) = 1$

B. $g(e^3) = 3$

C. $h(e^5) = 5$

D. $\lim_{x \to 1} \frac{g(x)}{h(x)} = 1$

Answer: A::B::C::D

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211. If $\int \sin^{-1}\sqrt{\frac{x}{1+x}}dx = f(x)\sin^{-1}\sqrt{\frac{x}{1+x}} - \sqrt{x} + (hog)(x) + c$, then

A. $f(x) = x$

B. $g(x) = \sqrt{x+1}$

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

D. $g(x) = \sqrt{x}$

Answer: A::B::C

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212. Let f(x) be a polynomial satisfying f(0)=2, f'(0)=3 and f''(x)=f(x).

Answer the following the question based on above passage:

Which of the following is true:?

A. $f'(x) = \sqrt{\{f(x)\}^2 - 5}$

B. $f'(x) = \sqrt{\{f(x)\}^2 + 5}$

C. f'(x)=f(x)

D. none of these

Answer: B

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213. Let f(x) be a polynomial satisfying f(0)=2, f'(0)=3 and f''(x)=f(x).

Answer the following the question based on above passage:

f(x) is given by

A. $5\left(e^{x}-e^{-x}\right)$

B. $5\left(e^{x}+e^{-x}\right)$

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

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

Answer: C

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214. Let n be a positive interger such that $I_n = \int x^n \sqrt{a^2 - x^2} dx$

Answer the following the question based on above passage:

The value of I_1 is

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

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

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

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

Answer: D

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215. Let n be a positive interger such that $I_n = \int x^n \sqrt{a^2 - x^2} dx$

Answer the following the question based on above passage:

The value of the expression $\frac{\int_0^a x^4 \sqrt{a^2 - x^2} dx}{\int_0^a x^2 \sqrt{a^2 - x^2} dx}$ is equal to

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

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

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

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

Answer: D

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216. Match List-I with List-II

1. Match List - I with List - II

List - I	List - II
(1) $\int \frac{dx}{9\sin^2 x + 16\cos^2 x}$	(P) $2\left\{\sqrt{\frac{\tan x + \tan 2}{\cos 2}} - \sqrt{\frac{\cot x + \cot 2}{\sin 2}}\right\} + c$
(2) $\int \frac{\sin^{3/2} x + \cos^{3/2} x}{\sqrt{\sin^3 x \cos^3 x \cdot \sin(x+2)}} dx$	(Q) $\frac{2}{\sqrt{3}} \tan^{-1}\left(\frac{x}{\sqrt{3(x+1)}}\right) + c$
(3) $\int \frac{(x+2)dx}{\sqrt{x+1}(x^2+3x+3)}$	(R) $2\tan^{-1}\sqrt{x + \frac{1}{x} + 1} + c$
(4) $\int \frac{(x-1)}{(x+1)\sqrt{x^3+x^2+x}} dx$	(S) $\frac{1}{12} \tan^{-1}\left(\frac{3\tan x}{4}\right) + c$

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217. Match List - I with List-II

Let the functions defined in List - I have domain $(-\pi/2, \pi/2)$

List - I	List - II
(1) $x + \sin x$	(P) increasing
(2) $\sec x$	(Q) decreasing
(3) e^{-x}	(R) neither increasing nor decreasing

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218. If $\int\left(\sqrt{\tan x}+\sqrt{\cot x}\right)dx = a\tan^{-1}\left(\frac{\tan x - 1}{\sqrt{b\tan x}}\right) + c$, then the value of $\sqrt{a^4 + b^5}$ must be

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219. If $\int\left(\frac{\cos 8x - \cos 7x}{1 + 2\cos 5x}\right)dx = \frac{\sin 3x}{a} - \frac{\sin 2x}{b} + c$ then the last digit of $\left(a^b\right)^4$ must be

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220. If $\int \frac{1+\cos 8x}{\tan 2x - \cot 2x} dx = a\cos 8x + c$, then find the value of a.

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221. If $\int \frac{x + \left(\cos^{-1} 3x\right)^2}{\sqrt{1-9x^2}} dx = A\sqrt{1-9x^2} + B\left(\cos^{-1} 3x\right)^3 + C$, then find A-B

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222. If $\int \frac{\sin x^8 - \cos x^8}{1 - 2\sin x^2 \cos x^2} dx = a\sin 2x + c$, then find the value of a.

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223. Evaluate $\int \frac{dx}{(2x - x^2)^{3/2}}$

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224. Evaluate $\int \frac{\sqrt{\cos 2x}}{\sin x} dx$

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225. Evaluate $\int \frac{dx}{\cos x + \cos ecx}$

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226. Evaluate $\int \sqrt{\sec x - 1} dx, 0 < x < \frac{\pi}{2}$

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227. Evaluate $\int \frac{dx}{x^2(x^4+1)^{3/4}}, x > 0$

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228. Evaluate $\int \cos 2\theta \log\left(\frac{\cos\theta + \sin\theta}{\cos\theta - \sin\theta}\right) d\theta$

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229. Evaluate $\int \cos\left(2\cot^{-1}\sqrt{\frac{1-x}{1+x}}\right)dx,\ -1 < x \leq 1$

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230. Evaluate $\int \frac{2x\,dx}{1+x^4}$

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231. Find the value of $\int \frac{\sin x + \cos x}{\sin(x-\alpha)}dx =$

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

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

where C is an arbitrary constant.

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

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

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

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

Answer:

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

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235. $\int 2^x\left(f'(x)+f(x)\log 2\right)dx$ is equal to

A. $2^x f'(x) + c$

B. $2^x \log 2 + c$

C. $2^x f(x) + c$

D. $2^x + c$

Answer:

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236. The integral $\int \frac{dx}{x^2(x^4+1)^{\frac{3}{4}}}$ equals:

A. $(x^4+1)^{\frac{1}{4}} + c$

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

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

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

Answer:

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237. The value of $\int \frac{(x-2)dx}{\left\{(x-2)^2(x+3)^7\right\}^{1/3}}$ is

A. $\frac{3}{20}\left(\frac{x-2}{x+3}\right)^{4/3}+c$

B. $\frac{3}{20}\left(\frac{x-2}{x+3}\right)^{3/4}+c$

C. $\frac{5}{12}\left(\frac{x-2}{x+3}\right)^{4/3}+c$

D. $\frac{3}{20}\left(\frac{x-2}{x+3}\right)^{5/3}+c$

Answer:

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

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

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

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

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

Answer:

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239. If ∫f(x) dx =Ψ(x) , then ∫x^5 f(x^3) dx is equal to

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

B. $\frac{1}{3}\left[x^3\Psi\left(x^3\right)-\int x^3\Psi\left(x^3\right)dx\right]+C$

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

D. 13x3Ψ(x3)−3∫x3Ψ(x3)dx+C

Answer:

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240. If the integral $\int \frac{5\tan x}{\tan x - 2} dx = x + aIn|\sin x - 2\cos x| + k$, then a is equal to

A. -1

B. -2

C. 1

D. 2

Answer:

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241. The integral $\int \frac{\sec^2 x}{(\sec x + \tan x)^{9/2}} dx$ equals (for some arbitrary constant K)

A. $-\frac{1}{(\sec x + \tan x)^{9/2}} \left\{ \frac{1}{11} - \frac{1}{7}(\sec x + \tan x)^2 \right\} + K$

B. $\frac{1}{(\sec x + \tan x)^{9/2}} \left\{ \frac{1}{11} - \frac{1}{7}(\sec x + \tan x)^2 \right\} + K$

C. $-\frac{1}{(\sec x+\tan x)^{9/2}}\left\{\frac{1}{11}+\frac{1}{7}(\sec x+\tan x)^2\right\}+K$

D. $\frac{1}{(\sec x+\tan x)^{9/2}}\left\{\frac{1}{11}+\frac{1}{7}(\sec x+\tan x)^2\right\}+K$

Answer:

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