MATHS

BOOKS - OMEGA PUBLICATION

INTEGRALS

Questions

1. Find $\int \sec x (\sec x + \tan x) dx$.

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2. Evaluate the following integrals : $\int (1 - x) \sqrt{x} \, dx$

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

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4. Evaluate the following integrals:

$$\int \frac{\left(\sec^2 x\right) dx}{\cos ec^2 x}$$

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5. Evaluate $\displaystyle\int \frac{e^{\tan^{-1} x}}{1+x^2} \, dx$

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6. Evaluate $\displaystyle\int \frac{2 - 3\sin x}{\cos^2 x} dx$

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7. If $\left(\dfrac{d}{dx}\right)f(x) = 4x^3 - \dfrac{3}{x^4}$ such that $f(2) = 0$. Then $f(x)$ is

8. Evaluate : $\displaystyle\int \tan x\, dx$.

9. Evaluate $\displaystyle\int \cot x\, dx$.

10. Evaluate $\displaystyle\int \sec x\, dx$.

11. Evaluate $\int \operatorname{cosec} x\, dx.$

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12. Evaluate $\int \dfrac{(1 + \log x)^2}{x}\, dx$.

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13. Evaluate $\int \dfrac{\sin x}{\sin(x + a)}\, dx.$

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14. Evaluate $\int 2x \sin(x^2 + 1)\, dx.$

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15. Evaluate $\int x (\log x)^2 dx$.

16. Evaluate $\int \sin x \sin(\cos x) dx$.

17. Evaluate $\int x^2 \log x\, dx$.

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

19. Evaluate $\int \left(\sin^{-1} x \right)^2 dx$

20. Evaluate $\int \dfrac{e^{2x} - 1}{e^{2x} + 1} \, dx.$

21. Evaluate the following integrals : $\int \dfrac{\tan^4 \sqrt{x} \sec^2 \sqrt{x}}{\sqrt{x}} dx$

22. Evaluate $\int \cot x \, \log(\sin x) dx.$

23. Evaluate $\int \dfrac{1}{1+\cot x}\,dx.$

24. Evaluate $\int \dfrac{\sqrt{\tan x}}{\sin x \cos x}\,dx.$

25. Evaluate $\int \dfrac{\sin\left(\tan^{-1} x\right)}{1+x^2}\,dx.$

26. Evaluate the following integrals : $\int \dfrac{\sin\sqrt{x}}{\sqrt{x}}\,dx$

27. Find the following integerals : $\int \cos 2x \cos 4x \cos 6x dx$

28. Evaluate , $\int \sin^3 x \cos^3 x \, dx$

29. Integrate : $\int \dfrac{\cos 2x - \cos 2\alpha}{\cos x - \cos \alpha} dx.$

30. Evaluate $\int \dfrac{\sin 2x}{\sin 5x \sin 3x} dx.$

31. Evaluate $\int \dfrac{1}{\sin x \cos^3 x} dx.$

32. Evaluate $\int \dfrac{1}{\cos(x-a)\cos(x-b)} dx$

33. Evaluate $\int \dfrac{3x^2}{x^6+1} dx.$

34. Evaluate $\int \dfrac{\sec^2 x \, dx}{\sqrt{\tan^2 x + 4}}$

35. Evaluate $\displaystyle\int \frac{1}{\sqrt{(2-x)^2+1}}\,dx$

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36. Evaluate $\displaystyle\int \frac{1}{9x^2+6x+5}\,dx$

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37. Evaluate : $\displaystyle\int \frac{dx}{3x^2+13x-10}$.

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38. Evaluate $\displaystyle\int \frac{dx}{\sqrt{7-6x-x^2}}$

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39. Evaluate $\int \frac{6x + 7}{\sqrt{(x - 5)(x - 4)}} dx.$

40. Evalute : $\int \frac{5x + 3}{\sqrt{x^2 + 4x + 10}} dx$

41. Evaluate the following integrals:

$\int \frac{x + 3}{\sqrt{5 - 4x - x^2}} dx$

42. Evaluate $\int \frac{1}{x^2 - 6x + 13} dx.$

43. Evaluate $\displaystyle\int \frac{dx}{\sqrt{5x^2 - 2x}}$.

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44. Evaluate $\displaystyle\int \frac{dx}{\sqrt{8 + 3x - x^2}}$.

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45. Evaluate $\displaystyle\int \frac{x + 3}{x^2 - 2x - 5}dx$.

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46. Evaluate $\displaystyle\int \frac{1 - x^2}{x(1 - 2x)}dx$

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47. Evaluate $\int \dfrac{x}{(x+1)(x+2)}\,dx$

48. Evaluate $\int \dfrac{3x-1}{(x-1)(x-2)(x-3)}\,dx$

49. Evaluate $\int \dfrac{3x-1}{(x-1)(x-2)(x-3)}\,dx$

50. Evaluate $\int \dfrac{x}{(x-1)^2(x+2)}\,dx$

51. Evaluate: $\displaystyle\int \frac{5x}{(x+1)(x^2-4)}\,dx$

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52. Evaluate $\displaystyle\int \frac{3x-1}{(x-2)^2}\,dx$

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53. Evaluate $\displaystyle\int \frac{\cos x\, dx}{(1-\sin x)(2-\sin x)}$

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54. Evaluate $\displaystyle\int \frac{2x}{x^2+3x+2}\,dx$

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55. Evaluate: $\int \dfrac{5x}{(x+1)(x^2-4)}\,dx$

56. Evaluate the following integrals: $\int \dfrac{x^2}{(x^2+1)(x^2+4)}\,dx$

57. Evaluate $\int \dfrac{e^x\,dx}{e^x(e^x-1)}$.

58. Evaluate $\int x\sin 3x\,dx$

59. Evaluate $\int x^2 \sin x \, dx$

60. Evaluate $\int x \log 2x \, dx$.

61. Evaluate $\int \frac{x \sin^{-1} x}{\sqrt{1 - x^2}} \, dx$.

62. Evaluate $\int \frac{dx}{\sqrt{5 - 4x - 2x^2}}$

63. Evaluate $\int x \sin^{-1} x \, dx$

64. Evaluate $\int x \cos^{-1} x \, dx.$

65. Evaluate $\int x \tan^{-1} x \, dx$

66. Evaluate $\int e^x \left(\dfrac{1}{x} - \dfrac{1}{x^2} \right) dx.$

67. Evaluate $\int e^{2x} \sin x \, dx$

68. Evaluate $\int \dfrac{xe^x}{(1+x)^2} \, dx$

69. Evaluate $\int e^x \left(\dfrac{1 + \sin x}{1 + \cos x} \right) dx$

70. Integrate the following function

$\sqrt{4 - x^2}$

71. Integrate the following function

$$\sqrt{1 - 4x^2}$$

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72. Integrate the following function

$$\sqrt{x^2 + 4x - 5}$$

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73. Integrate the following function

$$\frac{x + \cos 6x}{3x^2 + \sin 6x}$$

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74. If $\int (e^{ax} + bx) dx = e^{4x}4 + \dfrac{3x^2}{2}$ find the value of a and b.

75. Find $\int (1 + x - x^2) \, dx$.

76. Evlauate $\int (x + 1) \sqrt{2x^2 + 3} dx$

77. Evaluate the following integrals:

$$\int (x + 3) \sqrt{3 - 4x - x^2} dx$$

78. Evaluate $\int_a^b x \, dx$ **as a limit of sum.**

79. Evaluate $\int_{-1}^{1} (x+1)(dx)$

80. Evaluate $\int_{a}^{b} x^2 dx$ as the limit of a sum.

81. Evaluate $\int_{0}^{1} x(1-x)^n dx$ by using properties of definite integrals.

82. Evaluate $\int_0^4 \left(x + e^{2x}\right) dx$ as the limit of a sum.

83. Evaluate: $\int_a^b \sin^2 x\, dx$ as the limit of a sum.

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85. Evaluate $\int_0^4 |x - 1| dx$.

86. Evaluate : $\displaystyle\int_2^8 |x - 5| dx.$

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87. Evaluate $\displaystyle\int_0^{\pi/2} \sin 2x \, dx.$

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88. Evaluate $\displaystyle\int_1^2 \frac{5x^2}{x^2 + 4x + 3} dx.$

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89. Evaluate: $\displaystyle\int_0^1 \log\left(\frac{1}{x} - 1\right) dx$

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90. Evaluate $\displaystyle\int_0^1 \left(xe^{2x} + \sin\frac{\pi x}{2} \right) dx.$

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91. Evaluate $\displaystyle\int_{\pi/6}^{\pi/3} \left(\frac{1}{1 + \sqrt{\tan x}} \right) dx$

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92. Evaluate $\displaystyle\int_0^2 \frac{6x + 3}{x^2 + 4} dx$

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93. Evaluate $\displaystyle\int_0^{\pi/2} \sqrt{\sin\theta} \cos^5\theta d\theta.$

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

95. Evaluate: $\displaystyle\int_{-\frac{\pi}{4}}^{\frac{\pi}{4}} \sin^2 x \, dx$

96. Evaluate : $\displaystyle\int_0^{2\pi} \cos^5 x \, dx.$

97. Evaluate : $\displaystyle\int_{-\frac{\pi}{2}}^{\frac{\pi}{2}} \sin^2 x \, dx$

98. Find the following integrals

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

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

100. Evaluate : $\int_0^{\pi} \frac{x \sin x}{1 + \cos^2 x} dx$

101. Evaluate $\int_0^{\pi/2} \frac{\cos^5 x \, dx}{\sin^5 x + \cos^5 x}.$

102. Evaluate: $\displaystyle\int_{-1}^{2} |x^3 - x| dx$

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103. Evaluate : $\displaystyle\int_{-5}^{5} |x + 2| dx.$

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106. Evaluate $\displaystyle\int_0^{\pi} \frac{x}{1 + \sin x}\,dx.$

107. Evaluate $\displaystyle\int_{-\pi/2}^{\pi/2} \sin^7 x\,dx.$

108. Prove that $\displaystyle\int_0^{\pi/2} \frac{\sin x - \cos x}{1 + \sin x \cos x}\,dx = 0.$

109. Find $\displaystyle\int \sec x(\sec x + \tan x)\,dx.$

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163. Evaluate $\int \dfrac{5x}{(x + 1)(x^2 + 9)} dx$

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165. Evaluate $\int \dfrac{e^x dx}{e^x(e^x - 1)}.$

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178. Integrate the following function

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187. Evaluate $\int_0^5 (x + 1)\,dx$ as a limit of sum.

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190. Evaluate $\displaystyle\int_0^4 (x + e^{2x}) dx$ as the limit of a sum.

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191. Evaluate $\displaystyle\int_n^b \sin^2 x dx$ as the limit of a sum.

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193. Evaluate $\displaystyle\int_0^4 |x-1|dx.$

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195. Evaluate $\displaystyle\int_0^{\pi/2} \sin 2x dx.$

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200. Evaluate $\int_0^2 \dfrac{6x + 3}{x^2 + 4} dx$

201. Evaluate $\displaystyle\int_0^{\pi/2} \sqrt{\sin\theta}\,\cos^5\theta\,d\theta.$

202. Evaluate $\displaystyle\int_0^{\frac{\pi}{2}} \frac{\sqrt{\sin x}}{\sqrt{\sin x} + \sqrt{\cos x}}\,dx$

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206. Evaluate $\displaystyle\int_{0}^{\frac{\pi}{2}} \frac{\sin^4 x}{\sin^4 x + \cos^4 x}\, dx$.

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207. Evaluate : $\displaystyle\int_{0}^{\frac{\pi}{2}} \frac{\sin^{\frac{3}{2}} x}{\sin^{\frac{3}{2}} x + \cos^{\frac{3}{2}} x}\, dx$.

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208. Evaluate : $\displaystyle\int_{0}^{\pi} \frac{x \sin x}{1 + \cos^2 x}\, dx$

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210. Evaluate : $\displaystyle\int_{-1}^{2} \left|x^3 - x\right| dx$

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216. Prove that $\displaystyle\int_0^{\pi/2} \frac{\sin x - \cos x}{1 + \sin x \cos x}\,dx = 0.$

1. Evaluate $\displaystyle\int_{\pi/2}^{\pi} e^x \left(\frac{1 - \sin x}{1 - \cos x} \right) dx.$

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2. Evaluate : $\displaystyle\int_{0}^{\pi} \frac{x \tan x}{\sec x + \tan x} dx.$

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3. Evaluate $\displaystyle\int_{0}^{\pi/4} \frac{\sin x \cos x}{\cos^2 x + \sin^4 x} dx.$

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4. Evaluate the definite integral: $\int_{\frac{\pi}{6}}^{\frac{\pi}{3}} \dfrac{\sin x + \cos x}{\sqrt{\sin 2x}} dx$

5. Evaluate the following integral

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

6. Evaluate $\int \dfrac{1}{\sqrt{\sin^3 x \sin(x + \alpha)}} dx$.

7. Show that : $\int_0^{\pi/2} \left(\sqrt{\tan x} + \sqrt{\cot x}\right) dx = \sqrt{2}\pi$.

8. Evaluate : $\displaystyle\int_0^\pi \frac{xdx}{a^2\cos^2 x + b^2\sin^2 x}$.

9. Evaluate $\displaystyle\int\left(\frac{\sin^{-1}\sqrt{x} - \cos^{-1}\sqrt{x}}{\sin^{-1}\sqrt{x} + \cos^{-1}\sqrt{x}}\right)dx$.

10. Evaluate : $\displaystyle\int_0^{1/\sqrt{2}} \frac{1}{\sqrt{1-x^2}}dx$

11. Evaluate $\displaystyle\int_{\pi/2}^\pi e^x\left(\frac{1-\sin x}{1-\cos x}\right)dx$.

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16. Evaluate $\displaystyle\int \frac{1}{\sqrt{\sin^3 x \sin(x + \alpha) dx}}$.

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17. Show that : $\displaystyle\int_0^{\pi/2} \left(\sqrt{\tan x} + \sqrt{\cot x} \right) dx = \sqrt{2}\pi.$

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18. Evaluate : $\displaystyle\int_0^{\pi} \frac{x\,dx}{a^2 \cos^2 x + b^2 \sin^2 x}$.

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19. Evaluate $\displaystyle\int \left(\frac{\sin^{-1} \sqrt{x} - \cos^{-1} \sqrt{x}}{\sin^{-1} \sqrt{x} + \cos^{-1} \sqrt{x}} \right) dx.$

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20. Evaluate : $\displaystyle\int_0^{1/\sqrt{2}} \frac{1}{\sqrt{1-x^2}}\,dx$

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Multiple Choice Questions Mcqs

1. Choose the correct answer: $\displaystyle\int x^2 e^{x^3}\,dx$ equals :

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

B. $\dfrac{1}{3} e^{x^2} + c$

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

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

Answer: A

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2. Choose the correct answer: $\int e^x \sec x(1 + \tan x)dx$ equals :

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

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

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

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

Answer: B

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3. Choose the correct answer: $\int \sqrt{x^2 - 8x + 7}dx$ is equal to:

A.

$$\frac{1}{2}(x - 4)\sqrt{x^2 - 8x + 7} + 9\log\left|x - 4 + \sqrt{x^2 - 8x + 7}\right| + c$$

B.

$$\frac{1}{2}(x+4)\sqrt{x^2-8x+7}+9\log\left|x+4+\sqrt{x^2-8x+7}\right|+c$$

C.

$$\frac{1}{2}(x-4)\sqrt{x^2-8x+7}-3\sqrt{2}\log\left|x+4+\sqrt{x^2-8x+7}\right|+c$$

D.

$$\frac{1}{2}(x-4)\sqrt{x^2-8x+7}-\frac{9}{2}\log\left|x-4+\sqrt{x^2-8x+7}\right|+c$$

Answer: D

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4. $\displaystyle\int_{1}^{\sqrt{3}}\frac{dx}{1+x^2}$ equals :

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

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

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

D. $\dfrac{\pi}{12}$

Answer: D

5. $\displaystyle\int_0^{2/3} \dfrac{dx}{4+9x^2}$ equals

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

B. $\dfrac{\pi}{12}$

C. $\dfrac{\pi}{24}$

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

Answer: C

6. Choose the correct answer : The anti derivative of $\left(\sqrt{x} + \left(\dfrac{1}{\sqrt{x}} \right) \right)$ equals.

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

B. $\dfrac{2}{3} x^{2/3} + \dfrac{1}{2} x^2 + c$

C. $\dfrac{2}{3} x^{3/2} + 2x^{1/2} + c$

D. $\dfrac{3}{2} x^{3/2} + \dfrac{1}{2} x^{1/2} + c$

Answer: C

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7. $\displaystyle \int \dfrac{10x^9 + 10^x \log_e 10}{x^{10} + 10^x} \, dx$ is equal to :

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

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

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

D. $\log\left(10^x + x^{10}\right) + c$

Answer: D

8. Evaluate

$$\int \frac{dx}{\sin^2 x \cos^2 x}$$

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

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

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

D. $\tan x - \cot 2x + c$

Answer: B

9. $\int \dfrac{\sin^2 x - \cos^2 x}{\sin^2 x \cos^2 x} dx$ is equal to :

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

B. $\tan x + \mathrm{cosec} x + c$

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

D. $\tan x + \sec x + c$

Answer: A

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10. Evaluate the following integrals : $\int \dfrac{e^x(1+x)}{\cos^2(xe^x)} dx$

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

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

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

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

Answer: B

11. $\displaystyle\int \frac{dx}{x^2 + 2x + 2}$ equals :

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

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

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

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

Answer: B

12. $\int \dfrac{dx}{\left(\sqrt{9x - 4x^2}\right)}$ equals :

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

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

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

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

Answer: B

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13. $\int \dfrac{xdx}{(x - 1)(x - 2)}$ equals :

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

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

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

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

Answer: B

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14. $\displaystyle\int \frac{dx}{x(x^2+1)}$ equals :

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

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

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

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

Answer: A

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15. Choose the correct answer: $\int \sqrt{1 + x^2}\,dx$ is equal to:

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

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

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

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

Answer: A

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16. The value of the integral $\displaystyle\int_{\frac{1}{3}}^{1} \dfrac{\left(x - x^3\right)^{\frac{1}{3}}}{x^4}\,dx$ is:

A. 6

B. 0

C. 3

D. 4

17. If $f(x) = \int_0^x t \sin t \, dt$, then $f'(x)$ is

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

B. $x \sin x$

C. $x \cos x$

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

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

A. 2

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

C. 0

D. -2

Answer: C

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19. The value of $\displaystyle\int_{-\pi/2}^{\pi/2} \left(x^3 + x\cos x + \tan^5 x + 1\right) dx$ is :

A. 0

B. 2

C. π

D. 1

Answer: C

20. $\int \dfrac{dx}{e^x + e^{-x}}$ is equal to:

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

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

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

D. $\log(e^x + e^{-x}) + c$

Answer: A

21. $\int \left(\dfrac{\cos 2x}{(\sin x + \cos x)^2} \right) dx$ is equal to:

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

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

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

D. $\dfrac{1}{(\sin x + \cos x)^2} + c$

Answer: B

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22. If $f(a + b - x) = f(x)$, then $\displaystyle\int_a^b x f(x)dx$ is equal to:

A. $\dfrac{a + b}{2} \displaystyle\int_a^b f(b - x)dx$

B. $\dfrac{a + b}{2} \displaystyle\int_a^b f(b + x)dx$

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

D. $\dfrac{a+b}{2} \displaystyle\int_a^b f(x)\,dx$

Answer: D

23. The value of $\displaystyle\int_0^1 \tan^{-1}\left(\dfrac{2x-1}{1+x-x^2}\right)dx$ is:

A. 1

B. 0

C. -1

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

Answer: B

24. $\int \dfrac{1}{a^2 - x^2} dx$ equals

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

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

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

D. None of these

Answer: C

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25. $\int \dfrac{1}{\sqrt{a^2 - x^2}} dx$ equals

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

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

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

D. None of these

Answer: B

26. $\int \dfrac{1}{x^2 - a^2} dx$ equals

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

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

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

D. None of these

Answer: C

27. Choose the correct answer: $\int x^2 e^{x^3} dx$ equals :

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

B. $\dfrac{1}{3}e^{x^2} + c$

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

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

Answer: A

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28. Choose the correct answer of $\int e^x \sec x(1 + \tan x)dx.$

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

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

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

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

Answer: B

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29. $\int \sqrt{x^2 - 8x + 7} dx$ is equals to

A.

$$\frac{1}{2}(x - 4)\sqrt{x^2 - 8x + 7} + 9\log\left|x - 4 + \sqrt{x^2 - 8x + 7}\right| + c$$

B.

$$\frac{1}{2}(x + 4)\sqrt{x^2 - 8x + 7} + 9\log\left|x + 4 + \sqrt{x^2 - 8x + 7}\right| + c$$

C.

$$\frac{1}{2}(x - 4)\sqrt{x^2 - 8x + 7} - 3\sqrt{2}\log\left|x + 4 + \sqrt{x^2 - 8x + 7}\right| + c$$

D.

$$\frac{1}{2}(x - 4)\sqrt{x^2 - 8x + 7} - \frac{9}{2}\log\left|x - 4 + \sqrt{x^2 - 8x + 7}\right| + c$$

Answer: D

30. $\displaystyle\int_{1}^{\sqrt{3}} \frac{dx}{1+x^2}$ is equal to :

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

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

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

D. $\dfrac{\pi}{12}$

Answer: D

31. $\displaystyle\int_{0}^{2/3} \frac{dx}{4+9x^2}$ equals

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

B. $\dfrac{\pi}{12}$

C. $\dfrac{\pi}{24}$

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

Answer: C

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32. The anti derivative of $\left(\sqrt{x} + \dfrac{1}{\sqrt{x}} \right)$ equals

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

B. $\dfrac{2}{3} x^{2/3} + \dfrac{1}{2} x^2 + c$

C. $\dfrac{2}{3} x^{3/2} + 2x^{1/2} + c$

D. $\dfrac{3}{2} x^{3/2} + \dfrac{1}{2} x^{1/2} + c$

Answer: C

33. $\displaystyle\int \frac{10x^9 + 10^x \log_e 10}{x^{10} + 10^x}$ dx is equal to :

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

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

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

D. $\log\left(10^x + x^{10}\right) + c$

Answer: D

34. Evaluate

$$\int \frac{dx}{\sin^2 x \cos^2 x}$$

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

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

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

D. $\tan x - \cot 2x + c$

Answer: B

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35. $\int \frac{\sin^2 x - \cos^2 x}{\sin^2 x \cos^2 x} dx$ is equal to :

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

B. $\tan x + \mathrm{cosec} x + c$

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

D. $\tan x + \sec x + c$

Answer: A

36. Evaluate the following integrals : $\int \dfrac{e^x(1+x)}{\cos^2(xe^x)}dx$

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

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

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

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

Answer: B

37. $\int \dfrac{dx}{x^2 + 2x + 2}$ equals :

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

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

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

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

Answer: B

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38. $\int \dfrac{dx}{\left(\sqrt{9x - 4x^2}\right)}$ equals :

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

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

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

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

Answer: B

39. $\displaystyle\int \dfrac{x\,dx}{(x-1)(x-2)}$ equals :

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

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

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

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

Answer: B

40. $\int \dfrac{dx}{x(x^2+1)}$ equals :

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

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

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

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

Answer: A

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41. $\int \sqrt{1+x^2}\,dx$ is equal to

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

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

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

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

Answer: A

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42. The value of the integral $\displaystyle\int_{\frac{1}{3}}^{1} \dfrac{\left(x - x^3\right)^{\frac{1}{3}}}{x^4} dx$ is:

A. 6

B. 0

C. 3

D. 4

Answer: A

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43. If $f(x) = \int_0^x t \sin t \, dt$, then $f'(x)$ is

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

B. $x \sin x$

C. $x \cos x$

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

Answer: B

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

A. 2

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

C. 0

D. -2

Answer: C

45. The value of $\int_{-\pi/2}^{\pi/2} \left(x^3 + x\cos x + \tan^5 x + 1\right) dx$ is :

A. 0

B. 2

C. π

D. 1

Answer: C

46. $\int \dfrac{dx}{e^x + e^{-x}}$ is equal to:

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

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

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

D. $\log(e^x + e^{-x}) + c$

Answer: A

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47. $\int\left(\dfrac{\cos 2x}{(\sin x + \cos x)^2}\right) dx$ is equal to:

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

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

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

D. $\dfrac{1}{(\sin x + \cos x)^2} + c$

Answer: B

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48. If $f(a + b - x) = f(x)$, then $\int_a^b x f(x)dx$ is equal to:

A. $\dfrac{a + b}{2} \int_a^b f(b - x)dx$

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

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

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

Answer: D

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49. The value of $\int_0^1 \tan^{-1}\left(\dfrac{2x - 1}{1 + x - x^2}\right) dx$ is:

A. 1

B. 0

C. -1

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

Answer: B

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50. $\displaystyle\int \dfrac{1}{a^2 - x^2}\,dx$ equals

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

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

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

D. None of these

Answer: C

51. $\int \dfrac{1}{\sqrt{a^2 - x^2}} dx$ equals

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

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

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

D. None of these

Answer: B

52. $\int \dfrac{1}{x^2 - a^2} dx$ equals

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

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

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

D. None of these

Answer: C