MATHS

BOOKS - MAHAVEER PUBLICATION

METHODS OF INTEGRATION

Question Bank

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

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2. Evaluate $\int \frac{x+2}{(x^2+4x+5)^2}\,dx$

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3. Evaluate: $\int \frac{\sin x + \cos x}{\sin x - \cos x}\,dx$

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4. $\int \frac{\cos x}{1+\sin^2 x}\,dx$

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5. Evaluate $\int \frac{x^3}{1+x^8} dx$

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6. Evaluate: $\int x\sqrt{x^2+1} dx.$

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7. Evaluate $\int \frac{dx}{\sqrt{2x+1}}$

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8. Evaluate $\int \frac{\sin(\log x)}{x} dx$

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

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10. Evaluate: $\int \frac{e^{2x}}{1+e^x} dx$

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11. Evaluate $\int \frac{dx}{e^{-x}+1}$

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

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13. Evaluate: $\int \frac{e^{x}-e^{-x}}{e^{x}+e^{-x}}\,dx$

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

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15. Evaluate $\int \log x dx$

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16. Evaluate $\int x e^x dx$

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17. Evaluate $\int x \cos x dx$.

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18. Evaluate $\int x \sec^2 x dx$

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19. Evaluate: $\int x^2 \sin x \, dx$

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

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

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

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23. $\int \frac{\log x}{(1+x)^2} dx$

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

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25. $\int e^x (\cos x + \sin x) dx$

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

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

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28. $\int \frac{dx}{x^2 - 9}$

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29. Find the integral of the following integral

$$\int \frac{dx}{\sqrt{9x^2+1}}$$

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30. Find the integral of the following integral

$$\int \frac{3xdx}{2x^4+1}$$

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31. Evaluate $\int \frac{\cos x}{\sqrt{25 - \sin^2 x}} dx$

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

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33. Evaluate: $\int \frac{dx}{\sqrt{x^2 + 2x + 2}}$

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34. Integrate the Following Integral

$$\int \frac{2x-3}{\sqrt{2x^2-6x+1}}dx$$

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35. Integrate the Following Integral

$$\int \frac{2x+3}{\sqrt{x^2+2x+10}}dx$$

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36. Evaluate $\int \sqrt{x^2+16}dx$

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37. Evaluate $\int \sqrt{49 - 16x^2}\, dx$

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38. Evaluate $\int \sqrt{x^2 + 2x - 3}\, dx$

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39. Evaluate $\int \sqrt{8 - 2x - x^2}\, dx$

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40. Evaluate $\int \frac{x^2}{(x^2-4)} dx$

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41. Evaluate $\int \frac{x-1}{(x-2)(x-3)} dx$

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42. Evaluate $\int 3 \frac{x}{x^2-x-2} dx$

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

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44. $\int \frac{1}{1+3e^x+2e^{2x}} dx$

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45. Choose the correct answer of the given question

$$\int \frac{1}{1+\tan x} dx = \_\_ + c$$

A. log |sexc-tanx|

B. $2\frac{\sec^2 x}{2}$

C. log|x+sinx|

D. 1/2[x+log|sinx+cosx|]

Answer: D

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46. Choose the correct answer of the given question

$$\int \frac{e^x + 1}{e^x - 1} dx = \_\_ + c$$

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

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

C. $2\log|e^x - 1| - x$

D. $2\log|e^x + 1|$

Answer: C

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47. Choose the correct answer of the given question

$$\int \frac{1}{x(\log x)^n} dx = \_\_ + c$$

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

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

C. $\frac{(\log x)^n}{n}$

D. $\frac{\log x}{1-n}$

Answer: A

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48. $\int \frac{\cos\sqrt{x}}{\sqrt{x}} dx$

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

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

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

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

Answer: D

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49. Choose the correct answer of the given question

$$\int \sqrt{\frac{1-x}{x}}\,dx = \_\ \_ + c$$

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

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

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

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

Answer: C

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50. Choose the correct answer of the given question

$$\int 2^x dx = \_\ \_ + c$$

A. $2^x \log 2$

B. $\frac{2^x}{\log 2}$

C. $2^x \log x$

D. 2logx

Answer: B

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51. Choose the correct answer of the given question

$$\int e^{\sqrt{x}} dx = \_\ \_ + c$$

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

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

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

D. $2e^{\sqrt{x}}(x-1)$

Answer: A

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52. Choose the correct answer of the given question

$$\int \sqrt{\frac{1-\cos x}{2}}\,dx$$

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

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

C. 2sinx+c

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

Answer: D

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

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

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

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

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

Answer: B

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54. $\int \frac{1}{2+\cos x} dx$

A. `1/3 tan^-1(1/sqrt3 tan(x/2))

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

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

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

Answer: B

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55. Evaluate: $\int \frac{1}{e^x + e^{-x}}\, dx$

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

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

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

D. $1 + e^x + c$

Answer: A

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56. Choose the correct answer of the given question

$$\int \frac{dx}{1+x^2} = \_\_ + c$$

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

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

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

D. $\cot^{-1} x$

Answer: A

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57. $\int \frac{\sin x}{(1+\sin x)} dx = ?$

A. x+tanx+secx+c

B. x-tanx+c

C. x+secx+c

D. x-tanx+secx+c

Answer: D

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58. Choose the correct answer of the given question

$$\int \frac{1-x^4}{1-x}dx = \_\ \_ + c$$

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

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

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

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

Answer: C

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59. Evaluate $\int \frac{dx}{x + x \log x}$

A. 1+logx

B. x+logx

C. log(1+logx)+c

D. xlog(1+logx)+c

Answer: C

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60. $\int e^x [f(x) + f'(x)] dx =$

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

B. $\frac{e^x}{f(x)} + c$

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

D. $e^x + c$

Answer: A

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61. $\int \frac{e^x(1-\sin x)}{1-\cos x} dx$

A. $e^x \frac{\tan x}{2} + c$

B. $-e^x \frac{\cot x}{2} + c$

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

D. $e^x \frac{\cot x}{2} + c$

Answer: B

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62. Choose the correct answer of the given question

$$\int e^x \left(\frac{1}{x} - \frac{1}{x^2}\right) dx =$$

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

B. $e^x + c$

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

D. $-e^x + c$

Answer: C

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

A. 0

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

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

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

Answer: D

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64. Choose the correct answer of the given question

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

A. -cotx+c

B. cotx+c

C. -tanx+c

D. tanx+c

Answer: A

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65. Find the following integral (using Substitution method)

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

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66. Find the following integral (using Substitution method)

$$\int(2x+5)\sqrt{x^2+5x}dx$$

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67. Find the following integral

$$\int \frac{x^3}{1+x^3} dx$$

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68. Find the following integral (using Substitution method)

$$\int \frac{dx}{x(\log x)^2}$$

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69. Find the following integral (using Substitution method)

$$\int \frac{x^3}{\sqrt{x^2+1}} dx$$

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70. $\int \frac{e^x - 1}{e^x + 1} dx$

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71. Find the following integral (using Substitution method)

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

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72. Find the following integral (using Substitution method)

$$\int \frac{dx}{x \log x}$$

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73. Find the following integral (using Substitution method)

$$\int x\left(3x^2+7\right)^7 dx$$

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74. Find the following integral (using Substitution method)

$$\int\left(3x^2-5x+7\right)^m(6x-5)dx$$

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75. Evaluate the following integrals:

$$\int x \cos 2x dx$$

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76. Integrate the following :

$$\int x \sin x dx.$$

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77. $\int x \sin^2 x dx$

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

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79. Find the following integral (using Integration by parts method)

$\int x \sec^{-1} x dx$

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80. $\int x^2 \log x dx.$

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81. $\int x^2 \tan^{-1} x dx$

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

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

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84. Find the following integral (using Integration by parts method)

$\int x^3 e^x dx$

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85. Find the following integral (using partial fraction method)

$$\int \frac{2x+1}{(x-1)(x+2)(x-3)} dx$$

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86. Find the following integral (using partial fraction method)

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

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87. Find the following integral (using partial fraction method)

$$\int \frac{2x+1}{(x+1)(x-2)}\,dx$$

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

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89. Find the following integral (using partial fraction method)

$$\int \frac{dx}{x(x^2+8)}$$

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90. $$\int \frac{dx}{x^4-1}$$

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91. Find the following integral (using partial fraction method)

$$\int \frac{3x}{(x-1)(x-2)} dx$$

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92. Evaluate the following Integrals :

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

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93. Find the following integral (using partial fraction method)

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

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94. $\int \frac{x^3+x+1}{x^2-1} dx$

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95. Evaluate $\int \frac{1}{x^2+4x+8} dx$

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96. $\int \frac{1}{3x^2 + 13x - 10} dx$

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

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98. $\int \frac{1}{x^2 - 5x + 6} dx$

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99. $\int \frac{dx}{\sqrt{(x-1)(x-2)}}$

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100. Evaluate

$$\int \frac{1}{\sqrt{9+8x-4x^2}}dx$$

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101. $\int \frac{x+2}{\sqrt{x^2+5x+6}} dx$

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

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103. $\int \sqrt{4x^2+9} dx$

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104. $\int \sqrt{8+2x-x^2}dx$

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105. Evaluate

$\int \sqrt{9x^2+4}dx$

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106. Evaluate

$\int \sqrt{5-2x-x^2}dx$

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