



## MATHS

### BOOKS - NAGEEN MATHS (HINGLISH)

#### INTEGRATION

#### Solved Example

1. Evaluate :  $\int x^5 dx$



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2. Evaluate :  $\int \sqrt{x} dx$



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

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4. Evaluate :  $\int \sqrt{1 - \cos^2 x} dx$

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5. Evaluate :  $\int \frac{1}{\operatorname{cosec} x} dx$

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6. Evaluate :  $\int (6 \sin x) dx$

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7. Evaluate :  $\int (3e^x - \frac{1}{5x} + \sec x \tan x) dx$

A.  $e^x - \log_e x + \sec x + C$

B.  $3e^x - \frac{1}{5} \log_e x + \tan x \sec x + C$

C.  $3e^x - \frac{1}{5} \log_e x + \sec x + C$

D.  $3e^x + \log_e x + \sec x + C$

**Answer: C**



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

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

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

C.  $\frac{x^3}{3} + 2x - \frac{1}{x^{-2}} + C$

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

**Answer: A**



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



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10. Evaluate:  $\int \frac{1}{\sin^2 x \cos^2 x} dx$



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11. Evaluate :  $\int \left( \frac{ax^4 + bx^2 + C}{x^4} \right) dx$

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12. Evaluate :  $\int \frac{\cos 2x}{\sqrt{1 + \sin 2x}} dx$

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13. Evaluate :  $\int \frac{\sin x}{\cos^2 x} dx$

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14. Evaluate :  $\int \frac{e^{\log x}}{x} dx$

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15. Evaluate :  $\int \frac{4+3 \sin x}{\cos^2 x} dx$

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16. Evaluate :  $\int \frac{\sec x + \tan x}{\sec x - \tan x} dx$

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17. Evaluate :  $\int \sec^2 3x dx$

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18. Evaluate :  $\int \sqrt{4 - 5x} dx$

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

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20. Evaluate :  $\int \frac{1}{\sqrt{1 - 9x^2}} dx$

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21. Evaluate :  $\int \frac{1}{b^2 + a^2x^2} dx$

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

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23. Evaluate :  $\int \sin 5x \cdot \cos x \, dx$

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24. Evaluate :  $\int x^3 \cos x^4 \, dx$

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25. Evaluate:  $\int n \cdot x^{n-1} \cdot \cos x^n \, dx$

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



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27. Evaluate:  $\int \frac{\log x}{x} dx$

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28. Evaluate  $\int \frac{dx}{x + \sqrt{x}}$

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29. Evaluate :  $\int \frac{x^3}{1 + x^8} ds$

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30. Evaluate :  $\int x^3 \sqrt{x^2 - 4} dx$

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31. Evaluate :  $\int x \sin^3 x^2 \cdot \cos x^2 dx$

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

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33. Evaluate :  $\int \frac{x^4 + 1}{x^6 + 1} dx$

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34. Evaluate:  $\int \frac{x^2 \tan^{-1} x^3}{1 + x^6} dx$

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35. Evaluate:  $\int \frac{e^{m \sin^{-1} x}}{\sqrt{1 - x^2}} dx$

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36. Evaluate:  $\int \frac{1}{x^2 \cos^2\left(\frac{1}{x}\right)} dx$

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



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

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39. Evaluate :  $\int \frac{\sin(x - a)}{\sin(x + a)} dx$

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40.  $\int \frac{\sin(2x)}{a \cos^2 x + b \sin^2 x} dx =$

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41. Evaluate :  $\int \frac{1}{e^x - 1} dx$



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42. Evaluate:  $\int \frac{1 - \tan x}{1 + \tan x} dx$



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43. Evaluate :  $\int \frac{\tan(\sin^{-1} x)}{\sqrt{1 - x^2}} dx$



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44. Evaluate :  $\int \frac{\sin 2x}{\sin 5x \cdot \sin 3x} dx$



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45. Evaluate :  $\int \frac{\cos t (\log x)}{x} dx$

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46. Evaluate :  $\int \frac{1}{\cos (x+a) \cdot \sin (x+b)} dx$

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

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

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

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

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

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

**Answer: D**



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**49. Evaluate:**  $\int \frac{1}{2 + \cos x} dx$

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

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

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

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

**Answer: D**



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

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

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

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

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

**Answer: C**



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51. Evaluate :  $\int \frac{1}{x^2} \cdot \log x dx$

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

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

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

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

**Answer: B**



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



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53. Evaluate :  $\int \frac{e^{1/x}}{x^3} dx$

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54. Evaluate  $\int \sec^3 x dx$ .

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

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

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57. Evaluate:  $\int \sin^{-1} \sqrt{\frac{x}{a+x}} dx$

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58. Evaluate  $\int e^{2x} \sin 3x dx$ .

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59. Evaluate:  $\int \sin(\log x) dx$

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60. Evaluate:  $\int e^x \left( \log x + \frac{1}{x} \right) dx$

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61. Evaluate :  $\int e^x \cos^2 x (\cos x - 3 \sin x) dx$

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62. Evaluate:  $\int \frac{x - \sin x}{1 - \cos x} dx$

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

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

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

D.  $x \tan. \frac{x}{2} + c$

**Answer: A**

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

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64. Evaluate:  $\int \sqrt{9 - x^2} dx$

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65. Evaluate:  $\int \cos x \sqrt{4 - \sin^2 x} dx$

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66. Evaluate: (i)  $\int \sqrt{4x^2 + 9} dx$  (ii)  $\int \sqrt{x^2 + 2x + 5} dx$

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67. Evaluate :  $\int \sec x \tan x \sqrt{4 \sec^2 x - 1} dx$



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



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69. Evaluate :  $\int \frac{\sin x}{(1 + \cos x)(2 + 3 \cos x)} dx$

A.  $\log \left| \frac{2 + \cos x}{2 + 3 \cos x} \right| + c$

B.  $\log \left| \frac{1 + \cos x}{4 + 3 \cos x} \right| + c$

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

D.  $\log \left| \frac{1 + 2 \cos x}{2 + 3 \cos x} \right| + c$

Answer: C



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



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

- A.  $x + 3 \log(x - 2) - \log(x + 1) + c$
- B.  $x + 3 \log(x - 2) - \log(8x + 1) + c$
- C.  $x + 3 \log(7x - 2) - \log(x + 1) + c$
- D.  $x + 3 \log(x - 2) - \log(x + 3) + c$

Answer: A



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

A.  $\frac{1}{6} \log \left| \frac{5x - 1}{x + 1} \right| + \frac{\sqrt{2}}{3} \tan^{-1} \cdot \frac{x}{\sqrt{2}} + C$

B.  $\frac{1}{6} \log \left| \frac{x - 1}{x + 1} \right| + \frac{\sqrt{2}}{3} \tan^{-1} \cdot \frac{x}{\sqrt{2}} + C$

C.  $\frac{1}{6} \log \left| \frac{x - 1}{7x + 1} \right| + \frac{\sqrt{2}}{3} \tan^{-1} \cdot \frac{x}{\sqrt{2}} + C$

D.  $\frac{1}{6} \log \left| \frac{2x - 1}{x + 1} \right| + \frac{\sqrt{2}}{3} \tan^{-1} \cdot \frac{x}{\sqrt{2}} + C$

Answer: B



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73. Evaluate :  $\int \frac{x}{(x-2)(x-1)} dx$



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



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

A.  $-\log|x+1| + \frac{1}{2}\log|5x^2+1| + c$

B.  $-\log|3x+1| + \frac{1}{2}\log|x^2+1| + c$

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

D.  $\log|x+1| + \frac{1}{2}\log|x^2+1| + c$

Answer: C



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76. Evaluate :

$$\int \frac{1}{x [6(\log x)^2 + 7 \log x + 2]} dx = \log \left| \frac{1 + \log x^2}{2 + \log x^3} \right| + c$$



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



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

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

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

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

$$\text{D. } \frac{1}{3} \log \left| \frac{3x - 2}{2x + 2} \right| + c$$

**Answer: A**



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**79. Evaluate:**  $\int \frac{1}{4x^2 + 4x + 5} dx$

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

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

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

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

**Answer: D**



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

A.  $\frac{3}{4} \log|2x^2 - 2x + 3| + \frac{\sqrt{5}}{2} \tan^{-1} \left( \frac{2x - 1}{\sqrt{5}} \right) + c$

B.  $\frac{3}{4} \log|5x^2 - 2x + 3| + \frac{\sqrt{5}}{2} \tan^{-1} \left( \frac{2x - 1}{\sqrt{5}} \right) + c$

C.  $\frac{3}{4} \log|2x^2 - 2x + 7| + \frac{\sqrt{5}}{2} \tan^{-1} \left( \frac{2x - 1}{\sqrt{5}} \right) + c$

D.  $-\frac{3}{4} \log|2x^2 - 2x + 3| + \frac{\sqrt{5}}{2} \tan^{-1} \left( \frac{2x - 1}{\sqrt{5}} \right) + c$

**Answer: A**



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

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

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83.  $\int \sqrt{2x^2 - 5x - 1} dx$

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84. Evaluate :  $\int \frac{1}{1 + \cos^2 x} dx$

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85. Evaluate:  $\int \frac{1}{a^2 \sin^2 x + b^2 \cos^2 x} dx$

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86. Evaluate :  $\int \frac{1}{5 + 4 \cos x} dx$

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87. Evaluate :  $\int \frac{1}{4 + 5 \sin x} dx$

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

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

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90. Evaluate:  $\int \sqrt{\tan x} dx$

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91. Evaluate :  $\int_0^{\pi/4} \tan x \cdot \sec x dx$

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92. Evaluate :  $\int_0^{\pi/4} \tan^2 x dx$



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93. Evaluate :  $\int_0^a \frac{1}{\sqrt{a^2 - x^2}} dx$



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94. Evaluate :  $\int_1^4 \frac{1}{\sqrt{x}} dx$



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95. Evaluate :  $\int_0^{\pi/2} \sin x dx$



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96. Evaluate :  $\int_0^a \frac{dx}{x^2 + a^2}$



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97. Evaluate:  $\int_0^{\pi/4} \sqrt{1 + \sin 2x} dx$  (ii)  $\int_0^{\pi/4} \sqrt{1 - \sin 2x} dx$



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98.  $\int_0^2 \sqrt{6x + 4} dx$



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99. Evaluate :  $\int_0^{\pi/4} \sin 2x \sin 3x dx$



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100. Evaluate:  $\int_0^4 \frac{dx}{\sqrt{x^2 + 2x + 3}}$

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101. Evaluate the following definite integral:  $\int_1^4 \frac{x^2 + x}{\sqrt{2x + 1}} dx$

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102. Evaluate:  $\int_0^4 x \cdot e^{2x} dx$

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103. Evaluate:  $\int_0^{\pi/2} \sin^3 cx dx$

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104. Evaluate :  $\int_1^2 \frac{dx}{x\sqrt{x^2-1}}$

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105. Evaluate :  $\int_1^2 \frac{\cos(\log x)}{x} dx$

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106. Evaluate :  $\int_0^{\pi/6} \frac{\cos x}{3+4\sin x} dx$

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107. Evaluate :  $\int_0^1 \frac{x}{\sqrt{1+x^2}} dx$

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108. Evaluate :  $\int_0^{\pi/2} \sin^3 x \cos x dx$

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109. Evaluate :  $\int_0^1 \frac{x^2}{1+x^6} dx$

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110. Evaluate :  $\int_0^1 \frac{\sin^{-1} sx}{\sqrt{1-x^2}} dx$

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111. Evaluate:  $\int_0^1 \frac{(\tan^{-1} x)^2}{1+x^2} dx$

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

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113. Evaluate:  $\int_0^1 \frac{e^{\sqrt{x}}}{\sqrt{x}} dx$

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114. Evaluate:  $\int_0^1 \frac{x \tan^{-1} x}{(1+x^2)^{3/2}} dx$



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115. Evaluate :  $\int_0^9 \frac{1}{1 + \sqrt{x}} dx$



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116. Evaluate :  $\int_0^1 \cos^{-1} c dx$



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117. Evaluate :  $\int_0^{\pi/2} \frac{\cos x}{(1 + \sin x)(2 + \sin x)} dx$



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118. Evaluate:  $\int_0^{\pi/2} \frac{1}{(a^2 \cos^2 x + b^2 \sin^2 x)^2} dx$

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119. Prove that:  $\int_0^{\pi/2} \frac{\sin x}{\sin x + \cos x} dx = \frac{\pi}{4}$

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120. Prove that:  $\int_0^{\pi/2} \frac{1}{1 + \tan^3 x} = \frac{\pi}{4}$

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121. Prove:  $\int_0^{\pi/2} \log|\tan x| dx = 0$

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$$122. \int_{a/4}^{3a/4} \frac{\sqrt{x}}{\sqrt{a-x} + \sqrt{x}} dx = \frac{a}{4}$$

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$$123. \text{ Prove that: } \int_{-a}^a x^3 \sqrt{a^2 - x^2} dx = 0$$

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$$124. \text{ Prove that: } \int_{-a}^a \log\left(\frac{2-x}{2+x}\right) dx = 0$$

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$$125. \text{ Prove that: } \int_0^{\infty} \frac{x}{(1+x)(1+x)^2} dx = \frac{\pi}{4}$$





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126.

Prove

that:

$$\int_0^{\pi/2} \log(\sin x) dx = \int_0^{\pi/2} \log(\cos x) dx = \frac{-\pi}{2} \log 2$$



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127. Evaluate :

$$\int_0^{\frac{\pi}{2}} \frac{\sin^2 x}{s \in x + \cos x} dx$$



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128.

Evaluate:

$$\int_0^1 |5x - 3| dx \quad \text{(ii)} \quad \int_0^{\pi} |\cos x| dx \quad \text{(iii)}$$

$$\int_{-5}^5 |x - 2| dx \quad \text{(iv)} \quad \int_{-1}^1 e^{|x|} dx \quad \text{(v)} \quad \int_0^2 |x^2 + 2x - 3| dx \quad \text{(vi)}$$

$$\int_1^4 (|x - 1| + |x - 2| + |x - 3|) dx \quad \text{(vii)} \quad \int_{-1}^2 |x^3 - x| dx$$

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129. Evaluate :  $\int_0^{\pi} |\cos x| dx$

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130. Prove that  $\int_0^{\pi/8} \log|1 + \tan 2x| dx = \frac{\pi}{16} \log_e 2$ .

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131. Evaluate  $\int_a^b x^2 dx$  as limit of the sum.

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132. Evaluate:  $\int_a^b e^x dx$  using limit of sum

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133. Evaluate:  $\int_{-1}^2 e^x dx$  as a limit of sum.

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## Exercise 7a

1.  $\int x dx$

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

B.  $(x^2) + c$

C.  $x + c$

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

**Answer: A**



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



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3.  $\int x^{-6} \, dx$



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4.  $\int \frac{1}{x\sqrt{x}} dx$

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

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

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

D.  $-\frac{1}{3} \cdot x^{-1/2} + c$

**Answer: B**



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5.  $\int \frac{1}{\sqrt{x}} dx$



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6.  $\int z^{-1/3} dz$



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7.  $\int 2^x dx$



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8.  $\int b^{x+a} dx$



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9.  $\int \frac{1}{\sqrt{1-y^2}} dy$



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$$10. \int \frac{1}{t\sqrt{t^2 - 1}} dt$$

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$$11. \int \sec^2 z dz$$

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$$12. \int \frac{1}{\cos x \cdot \cot x} dx$$

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$$13. \int \frac{1}{4^{-x}} dx$$

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



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## Exercise 7b

1.  $\int \left( x^6 - \frac{1}{x} + e^x + 3 \right) dx$



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2.  $\int (ax^2 + bx + c) dx$



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3.  $\int (3x - 2)^3 dx$



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4.  $\int \tan^2 x dx$



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5.  $\int \left( \frac{3x - 2}{x} + e^x \right) dx$



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6.  $\int \frac{1}{1 - \sin x} dx$



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7.  $\int \frac{\sec x - \tan x}{\sec x + \tan x} dx$



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



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9.  $\int \sqrt{1 + \sin 2x} dx$



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10. Evaluate :  $\int \frac{1}{1 + \cos tx} dx$



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



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12.  $\int \frac{x}{x + a} dx$



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13.  $\int \frac{x^2 + 2x - 5}{\sqrt{x}} dx$



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14.  $\int (\tan x + \cos x)^2 dx$



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$$15. \int \frac{1}{1 + \cos 2x} dx$$



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$$16. \int \frac{1}{1 - \cos 2x} dx$$



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$$17. \int \sqrt{1 + \cos 2x} dx$$



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$$18. \int \sqrt{1 - \cos 2x} dx$$



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

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$$20. \int \frac{1 + \cos 2x}{1 - \cos 2x} dx$$

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$$21. (i) \int \frac{\cos^3 x + \sin^3 x}{\sin^2 x \cdot \cos^2 x} dx \quad (ii) \int \frac{\cos 2x}{\cos^2 x \sin^2 x} dx$$

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$$22. \int \frac{(x + 1)(2x - 3)}{x} dx$$

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$$23. \int e^{x+3} dx$$

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$$24. \int \frac{\sin x}{1 + \sin x} dx$$

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$$25. (i) \int \frac{(1+x)^3}{\sqrt{x}} dx \quad (ii) \int \frac{(1+x)^3}{x^4} dx$$

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$$26. \int \frac{1-x}{\sqrt{x}} dx$$



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## Exercise 7c

1. Evaluate:  $\int(ax + b)^3 dx$



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2.  $\int(3 - 7x)^5 dx$



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3.  $\int\sqrt{2x - 1} dx$



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$$4. \int \frac{1}{(a + bx)^5} dx$$

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$$5. \int \sqrt{2x + \frac{1}{3}} dx$$

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$$6. \int \frac{1}{(7x - 2)^2} dx$$

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$$7. (i) \int \frac{1}{5x + 1} dx \quad (ii) \int \frac{1}{\sqrt{x + 1} + \sqrt{x}} dx$$

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$$8. \int \frac{1}{\sqrt{5 - \frac{x^2}{4}}} dx$$

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$$9. \int \frac{1}{3 + (2 - 3x)^2} dx$$

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$$10. \int \cos(2x + 1) dx$$

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$$11. \int \sec^2(1 - 5x) dx$$

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12. Evaluate  $\int \cos^3 x dx$ .

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13.  $\int \cos 4x \cdot \cos 2x dx$

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14. (i)  $\int \sin 2x \cdot \cos 5x dx$       (ii)  $\int \frac{\sin 4x}{\sin x} dx$

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



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$$16. (i) \int \sqrt{1 + \sin. \frac{x}{2}} dx$$

$$(ii) \int \frac{1 + \cos 4x}{\cot x - \tan x} dx$$



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$$17. \int e^{2x+5} dx$$



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$$18. \int e^{4-3x} dx$$



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

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20.  $\int \{5a^x + 6a \cos(5x + 1)\} dx$

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21.  $\int \frac{1 dx}{(x - 2)\sqrt{x^2 - 4x + 3}}$

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

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23. If  $f'(x) = \frac{1}{x} + x^2$  and  $f(1) = \frac{4}{3}$  then find the value of  $f(x)$



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## Exercise 7d

1.  $\int \cos^3 x \cdot \sin x dx$



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2.  $\int x^2 \cdot \sin x^3 dx$



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3.  $\int \cos ec^2 x \cdot \sqrt{\cot} dx$



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4.  $\int \cot^3 x \cdot \cos ec^2 x dx$



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



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6.  $\int \frac{(\log_e x)^3}{x} dx$



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



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8.  $\int \sec x \cdot \log(\sec x + \tan x) dx$



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



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



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

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12.  $\int x^2 \cdot \tan^2 x^3 \cdot \sec^2 x^3 dx$

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

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14.  $\int x \cos^3 x^2 \cdot \sin x^2 dx$

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$$15. \int \frac{x^3}{(4 - x^4)^2} dx$$



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$$16. \int \frac{1}{x \cos^2(\log_e x)} dx$$



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$$17. \int \frac{\cos^2(\log. x)}{x} dx$$



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$$18. (i) \frac{\log x \cdot \sin [1 + (\log x)^2]}{x} dx$$

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

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$$19. \int \frac{1}{\cos^2 x (1 - \tan x)^2} dx$$

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$$20. \int \frac{x dx}{(1 + x^2)^{3/2}}$$

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$$21. \text{Evaluate: (i) } \int \frac{\sin x}{1 + \cos^2 x} dx \text{ (ii) } \int \frac{2x^3}{4 + x^8} dx$$



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22. Evaluate: (i)  $\int \frac{e^{\sqrt{x}} \cos(e^{\sqrt{x}})}{\sqrt{x}} dx$  (ii)  $\int \frac{\cos^5 x}{\sin x} dx$



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23.  $\int e^x \cdot (a + be^x)^n dx$



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24. (i)  $\int \frac{\tan^{-1} x}{(1+x^2)} dx$  (ii)  $\int \frac{1}{\sqrt{1-x^2} \sin^{-1} x} dx$



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$$25. \int \frac{\sin x \cdot \cos x}{a^2 \cos^2 x + b^2 \sin^2 x} dx$$



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$$26. \int \cos^2 x dx$$



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$$27. \int \sin^2 nx dx$$



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$$28. \int \sin^5 x dx$$



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$$29. \int \frac{(a + b \sin^{-1} x)^n}{\sqrt{1 - x^2}} dx$$



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$$30. \int \operatorname{cosec}^4 2x dx$$



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$$31. \int \sec^4 x dx$$



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$$32. \int \sin^{2/3} x \cos^3 x dx$$



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33.  $\int \cos 2x \cdot \cos 4x \cdot \cos 6x dx$

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

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35.  $\int \cos^4 2x dx$

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36. EVALUATE  $\int \cos^3(3x + 5) dx$

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37. Evaluate: (i)  $\int \frac{1}{x^2} \cos^2\left(\frac{1}{x}\right) dx$  (ii)  $\int \sec^4 x \tan x dx$

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

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## Exercise 7e

1. (i)  $\int \frac{e^x}{1 + e^x} dx$       (ii)  $\int \frac{e^x}{(1 + e^x)^4} dx$

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$$2. \int \frac{\cot x}{\log(\sin x)} dx$$



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$$3. \int \frac{\sin x}{a + b \cos x} dx$$



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$$4. \int \frac{x^2}{(x^3 + 4)^3} dx$$



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$$5. \int \frac{e^x(1+x)}{\sin^2(xe^x)} dx$$



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6.  $\int \frac{\sec^2 x}{\sqrt{\tan x}} dx$

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7. (i)  $\int \frac{1}{(1+x^2)\tan^{-1}x} dx$       (ii)  $\int \frac{e^{\tan^{-1}x}}{1+x^2} dx$

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8.  $\int \frac{e^x + \cos x}{e^x + \sin x} dx$

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9. (i)  $\int \frac{\sec x \cdot \cos ecx}{\log \cot x} dx$  (ii)  $\int \tan^4 x dx$

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10.  $\int \frac{\cot x}{1 + \sin x} dx$

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11. Evaluate:  $\int \frac{\sin x}{\sin(x - a)} dx$

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12. Evaluate:  $\int \frac{a}{b + ce^x} dx$

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$$13. (i) \int \frac{1}{\sqrt{1-x^2} \cdot \cos^{-1} x} dx$$

$$(ii) \int \frac{\sin(\tan^{-1} x)}{1+x^2} dx$$



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$$14. \int \frac{\sin 2x}{5 - \cos^2 x} dx$$



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$$15. (i) \int \frac{\cos x - x \sin x}{x \cos x} dx$$

$$(ii) \int \frac{1 + \cos x}{(x + \sin x)^3} dx$$



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$$16. \int \frac{x^{e-1} - e^{x-1}}{x^e - e^x} dx$$

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## Exercise 7f

1.  $\int \frac{\tan(1 + \log x)}{x} dx$

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

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3. (i)  $\int \sec^7 x \cdot \sin x dx$       (ii)  $\int \frac{1}{\sin x \cdot \cos^2 x} dx$

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4. Evaluate:  $\int \frac{1}{\cos(x - a)\cos(x - b)} dx$



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5. Evaluate:  $\int \frac{1}{\sqrt{4x^2 - 9}} dx$



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



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7.  $\int \frac{1}{5 + 4\cos x} dx$



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

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9.  $\int \frac{1}{4x^2 + 9} dx$

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10.  $\int \frac{x^2 dx}{4 + x^2}$

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11. Evaluate:  $\int \frac{1}{\sqrt{4x^2 - 9}} dx$

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$$12. \int \frac{1}{\sqrt{9x^2 - 1}} dx$$

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$$13. \text{ Evaluate: (i) } \int \frac{e^x}{\sqrt{4 - e^{2x}}} dx \text{ (ii) } \int \frac{x^2}{\sqrt{1 - x^6}} dx$$

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$$14. \text{ Evaluate: } \int \frac{1}{e^x + e^{-x}} dx$$

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$$15. \int \sqrt{\frac{x+1}{x-1}} dx$$

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16.  $\int \frac{1}{x^2(x^4 + 1)^{\frac{3}{4}}} dx$

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

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18. (i)  $\int \frac{\sin x}{\sqrt{4 + \cos^2 x}} dx$       (ii)  $\int \frac{x^2}{\sqrt{9 + x^6}} dx$

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19. (i)  $\int \frac{2 \cos x}{\sqrt{1 - 4 \cos^2 x}} dx$       (ii)  $\int \frac{x + 1}{\sqrt{x^2 + 1}} dx$

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20. Evaluate: (i)  $\int \frac{1}{\sqrt{1 + \cos 2x}} dx$  (ii)  $\int \frac{1}{\sqrt{1 - \cos x}} dx$

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21.  $\int \sec^{6/5} x \cdot \operatorname{cosec}^{4/5} x dx$

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22.  $\int \frac{x^2}{(a + bx)^2} dx$

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

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24.  $\int \sqrt{1 + 2 \tan x (\tan x + \sec x)} dx$

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## Exercise 7g

1.  $\int \log_e x dx$

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2. Evaluate :  $\int x^n \log x dx$ .



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3.  $\int x \cdot a^x dx$



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4.  $\int x \sec^2 x dx$



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5. Evaluate:  $\int x \log(1 + x) dx$



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6.  $\int x \sec^2 x \, dx$

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

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8. Evaluate: (i)  $\int \sec x \log(\sec x + \tan x) \, dx$  (ii)  
 $\int \operatorname{cosec} x \log(\operatorname{cosec} x - \cot x) \, dx$

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9.  $\int \sin \sqrt{x} \, dx$

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10. (i)  $\int x^2 \cos x \, dx$       (ii)  $\int x^2 e^{3x} \, dx$

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11. (i)  $\int x \sec^2 2x \, dx$       (ii)  $\int x \sin^3 x \, dx$

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

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13.  $\int \cot^{-1} x \, dx$



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14.  $\int x^3 e^{x^2} dx$  is equal to

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

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

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



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



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19.  $\int \frac{\sin^{-1} x}{(1 - x^2)^{\frac{3}{2}}} dx$



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



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21.  $\int \operatorname{cosec}^3 x \, dx$

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22.  $\int \sec(\tan^{-1} x) \, dx$

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

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24.  $\int e^{3x} \cos 2x \, dx$

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25. Evaluate  $\int e^{2x} \sin 3x dx$ .

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26.  $\int \frac{x}{(1 + \sin x)} dx$

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27.  $\int e^{\sqrt{x}} dx$

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28. Evaluate  $\int e^{2x} \sin 3x dx$ .

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$$29. \int \log \sin x \cdot \sec^2 x \, dx$$

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$$30. \int e^{\sin x} \cdot \sin 2x \, dx$$

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$$31. \int e^x \cdot \cos^2 x \, dx$$

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## Exercise 7h

1.  $\int e^x \cdot (\cot x - \operatorname{cosec}^2 x) dx$



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2.  $\int e^x \cdot \sin x (\sin x + 2 \cos x) dx$



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3. (i)  $\int e^x \cdot [\log (\sec x + \tan x) + \sec x] dx$

(ii)  $\int \frac{e^{-x} (\cos x - \sin x)}{\cos^2 x} dx$



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4.  $\int e^x (\log \sin x + \cot x) dx$



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

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6. Evaluate:  $\int \{s \in (\log x) + \cos(\log x)\} dx$

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7.  $\int \frac{2x - \sin 2x}{1 - \cos 2x} dx$

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

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

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10.  $\int \frac{x - 2}{x^3} \cdot e^x dx$

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11.  $\int e^{2x} (\tan x + 1)^2 dx$

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



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13. (i)  $\int \frac{e^x \cdot (1 - x)}{x^2} dx$

(ii)  $\int \left( \frac{1 + \sin x}{1 + \cos x} \right) e^x dx$



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14. The value of  $\int e^{\tan^{-1} x} \left( \frac{1 + x + x^2}{1 + x^2} \right) dx$



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15. Find  $\int \left[ \log(\log x) + \frac{1}{(\log x)^2} \right] dx$



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## Exercise 7i

1.  $\int \sqrt{9 - 4x^2} dx$



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



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3.  $\int \sec x \tan x \sqrt{\tan^2 x - 4} dx$



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



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$$5. \int \frac{x^2 + 1}{\sqrt{x^2 + 3}} dx$$



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$$6. \int x^2 \sqrt{x^6 - 1} dx$$



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$$7. \int \sec x \tan x \sqrt{\sec^2 x + 1} dx$$



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8.  $\int \sqrt{2 - 3x^2} dx$



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## Exercise 7j

1. Evaluate: (i)  $\int \frac{1}{a^2 - b^2 x^2} dx$  (ii)  $\int \frac{1}{a^2 x^2 - b^2} dx$



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



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



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4. Evaluate :  $\int \frac{2x - 3}{x^2 + 3x - 18} dx$



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



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6.  $\int \frac{x}{(x^2 - a^2)(x^2 - b^2)} dx$



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$$7. \int \frac{x}{(x-2)(x+1)} dx$$



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$$8. \int \frac{2x+3}{(x+2)(x-2)} dx$$



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$$9. \int \frac{1}{(x-2)(x+2)(x-2)} dx$$



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$$10. \int \frac{\cos x}{(1+\sin x)(2+\sin x)} dx$$



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11. 
$$\int \frac{dx}{x(1 + \log_e x)(3 + \log_e x)}$$

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12. 
$$\int \frac{x^3 + 3}{x^3 - 3x} dx$$

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

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14. 
$$\int \frac{x^2}{x^6 + x^3 - 2} dx$$



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$$15. \int \frac{e^x dx}{e^{2x} + 4e^x + 3}$$



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$$16. \int \frac{x^2}{(x-1)(x-2)(x-3)} dx$$



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$$17. \int \frac{1}{(x+1)^2 - 4} dx$$



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18.  $\int \frac{\cos x}{\cos 3x} dx$

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

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20. Evaluate:  $\int \frac{1}{\sin x (3 + 2 \cos x)} dx$

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

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$$22. (i) \int \frac{1}{x(x+1)^2} dx$$

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



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



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$$24. \int \frac{\sin x}{\sin(3x)} dx =$$



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$$25. \int \frac{x^2}{(a+bx)^2} dx$$



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



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



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28. Evaluate:  $\int \frac{1}{x^4 - 1} dx$



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



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$$30. \int \frac{1 - \cos x}{\cos x(1 + \cos x)} dx$$



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## Exercise 7k

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



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$$2. \int \frac{1}{5 + 4x + x^2} dx$$

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$$3. \int \frac{1}{2x^2 + 5x + 3} dx$$

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

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

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6.  $\int \frac{1}{2x^2 - 4x + 1} dx$

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

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8. Evaluate:  $\int \frac{x + 1}{x^2 + 4x + 5} dx$

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

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

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

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

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

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

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

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

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

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$$18. \int \frac{x + 1}{\sqrt{2x^2 + x - 3}} dx$$

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$$19. \int \frac{2x + 5}{\sqrt{x^2 + 3x + 1}} dx$$

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$$20. \int \frac{x}{\sqrt{x^2 + x + 1}} dx$$

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$$21. \int \sqrt{5 - 2x + x^2} dx$$



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$$22. \int \sqrt{x^2 + 4x + 1} dx$$



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$$23. \int \sqrt{2ax - x^2} dx$$



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$$24. \int (x + 2) \sqrt{x^2 + x} dx$$



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$$25. \text{ Evaluate: } \int (x - 5) \sqrt{x^2 + x} dx$$



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



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27. Evaluate:  $\int (2x - 5) \sqrt{2 + 3x - x^2} dx$



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## Exercise 7I

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



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



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$$3. \int \frac{1}{(a \sin x + b \cos x)^2} dx$$



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



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$$5. \int \frac{1}{3 \sin^2 x + 4 \cos^2 x} dx$$



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$$6. \int \frac{1}{\sin^2 x - 4 \cos^2 x} dx$$



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$$7. \int \frac{1}{\cos^2 x - 3 \sin^2 x} dx$$



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



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$$9. \int \frac{1}{(\sin x - 2 \cos x)(2 \sin x + \cos x)} dx$$



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10.  $\int \frac{1}{5 + 2 \cos x} dx$

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11.  $\int \frac{1}{5 - 4 \sin x} dx$

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12. Evaluate:  $\int \frac{1}{13 + 3 \cos x + 4 \sin x} dx$

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13.  $\int \frac{1}{3 + 2 \sin x + \cos x} dx$



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14. Evaluate:  $\int \frac{1}{2 + \cos x} dx$

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15.  $\int \frac{1}{4 + 5 \cos x} dx$

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16.  $\int \frac{1}{3 + 4 \sin x} dx$

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



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



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



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



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5.  $\int \sqrt{\cot x} dx$

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

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

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

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## Exercise 7n

1.  $\int_1^3 \frac{1}{x} dx$



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2.  $\int_0^a y^2 dx$



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3.  $\int_0^{\pi/4} \tan x dx$



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4.  $\int_0^{\pi/6} \sqrt{1 - \sin 2x} dx$

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5.  $\int_0^{\pi} \sin 3x dx$

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6.  $\int_{\pi/6}^{\pi/2} \cos x dx$

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7. Find  $\int_4^9 \sqrt{x} dx$

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$$8. \int_0^1 \frac{1}{\sqrt{1-x^2}} dx$$



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$$9. \int_{-\pi/4}^{\pi/4} \operatorname{cosec}^2 x dx$$



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$$10. \int_0^{\pi/2} \cos 3x dx$$



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$$11. \int_0^{\pi/4} \sin^2 x dx$$



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$$12. \int_0^{\pi/2} \sqrt{1 - \cos 2x} dx$$

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$$13. \int_0^{\pi/2} \sqrt{1 - \cos 2x} dx$$

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$$14. \int_0^{\pi/2} \sin^4 x dx$$

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$$15. \int_0^1 \frac{1}{x^2 + x + 1} dx$$

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$$16. \int_0^a \frac{dx}{\sqrt{ax - x^2}}$$

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$$17. (i) \int_0^{\pi/2} x \cos x dx$$

$$(i) \int_1^3 x \cdot \log x dx$$

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18. (i)  $\int_0^{\pi/2} x \sin x \cos x dx$

(ii)  $\int_0^{\pi/6} (2 + 3x^2) \cos 3x dx$



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19. Evaluate:  $\int_1^2 \frac{1}{(x+1)(x+2)} dx$  (ii)  $\int_1^2 \frac{1}{x(1+x^2)} dx$



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20.  $\int_{-1}^2 \sqrt{5x+6} dx$



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21.  $\int_0^{\pi/2} \sin^2 x dx$



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$$22. \int_0^{\pi/6} \cos x \cos 3x dx$$



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$$23. \int_0^{\pi/4} \frac{1}{1 + \cos 2x} dx$$



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$$24. \int_0^{\pi/2} (a \cos^2 x + b \sin^2 x) dx$$



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25. Evaluate :  $\int_{\frac{\pi}{3}}^{\frac{\pi}{4}} (\tan x + \cot x)^2 dx$

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26.  $\int_0^1 \frac{1}{1+x+2x^2} dx$

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27.  $\int_0^2 \frac{1}{4+x+x^2} dx$

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28.  $\int_1^2 \frac{1}{x(1+x)} dx$

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$$29. \int_1^2 \frac{x+3}{x(x+2)} dx$$



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$$30. \int_0^{\pi/2} x^2 \cos x dx$$



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$$31. \int_1^e \frac{e^x(1+x \log x)}{x} dx$$



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$$32. \int_a^{2a} \left( \sqrt{\frac{a}{x}} + \sqrt{\frac{x}{a}} \right)^2 dx$$



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## Exercise 7o

1. Evaluate the following integral:  $\int_1^3 \frac{\cos(\log x)}{x} dx$



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2.  $\int_0^a \frac{x}{\sqrt{a^2 - x^2}} dx$

A. -a

B. a

C. 2a

D. 0



**Answer: B**



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3. Evaluate the integrals  $\int_0^{\frac{\pi}{2}} \frac{\sin x}{1 + \cos^2 x} dx$



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



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5.  $\int_0^{\pi/4} \cos \theta \cdot \operatorname{cosec}^2 \theta d\theta$



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6. 
$$\int_0^{\pi/2} \frac{dx}{4 \sin^2 x + 5 \cos^2 x}$$

A.  $\frac{\pi}{2\sqrt{5}}$

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

C.  $\frac{\pi}{4\sqrt{5}}$

D.  $\frac{\pi}{\sqrt{5}}$

**Answer: C**



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7. 
$$\int_0^1 \frac{1}{e^x + e^{-x}} dx$$



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8.  $\int_{1/e}^e \frac{dx}{x(\log x)^{1/3}}$

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9.  $\int_1^2 \frac{dx}{x(1 + \log x)^2}$

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10.  $\int_{\pi/6}^{\pi/2} \frac{\operatorname{cosec} x \cot x}{1 + \operatorname{cosec}^2 x} dx$

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11. (i)  $\int_0^{\pi/4} e^{\tan x} \cdot \sec^2 x dx$   
(ii)  $\int_0^{\pi/4} \frac{\sin(\cos 2x)}{\operatorname{cosec} 2x} dx$



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$$12. \int_0^1 \frac{x \sin^{-1} x}{\sqrt{1+2x^2}} dx$$



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$$13. \int_0^2 \frac{e^{-1/x}}{x^2} dx$$



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$$14. \int_1^2 \frac{x}{\sqrt{1+2x^2}} dx$$



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15.  $\int_{-1}^2 \frac{x}{(x^2 + 1)^2} dx$

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16.  $\int_0^{1/\sqrt{2}} \frac{\sin^{-1}}{(1 - x^2)^{3/2}} dx$

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17.  $\int_0^{\pi} \frac{1 - x^2}{(1 + x^2)^2} dx$

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18.  $\int_0^{\pi} \frac{1}{5 + 2 \cos x} dx$

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$$19. \int_0^{\pi} \frac{1 - x^2}{(1 + x^2)^2} dx$$

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$$20. \int_0^{\pi/2} e^x (\sin x + \cos x) dx$$

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$$21. \int_0^{\pi} x \sin^2 x dx$$

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$$22. \int_1^2 \frac{\log_e x}{x^2} dx$$



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23. prove that  $\int_0^{\infty} \frac{x^2}{(x^2 + a^2)(x^2 + b^2)} dx = \frac{\pi}{2(a + b)}$



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24.  $\int_0^1 \frac{1}{x^2 + 2x + 3} dx$



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25.  $\int_0^{\pi/2} \frac{1}{4 + 3 \cos x} dx$



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$$26. \int_0^{\pi/4} e^x (\tan x + \sec^2 x) dx$$

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$$27. \int_1^2 \frac{1}{2(1+x^4)} dx$$

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$$28. \int_0^2 \sqrt{\frac{2+x}{2-x}} dx$$

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$$29. \int_0^{\pi/2} x \sin x \cos x dx$$

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$$30. \int_0^{\pi/2} \frac{dx}{1 + 2 \cos x}$$



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$$31. \int_0^1 x \sqrt{\frac{1-x^2}{1+x^2}} dx$$



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$$32. \int_0^{\pi} x \sin x \cdot \cos^2 x dx$$



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1. Prove that : 
$$\int_0^{\pi/2} \frac{\sqrt{\tan x}}{\sqrt{\tan x + \sqrt{\cot x}}} dx = \frac{\pi}{4}$$

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2. Prove that : 
$$\int_0^{\pi/2} \frac{\sqrt{\cos x}}{\sqrt{\sin x + \sqrt{\cos x}}} dx = \frac{\pi}{4}$$

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3. Prove that : 
$$\int_0^{\pi/2} \frac{\sin^3 x}{\sin^3 x + \cos^3 x} dx = \frac{\pi}{4}$$

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4. Prove that : 
$$\int_0^{\pi/2} \frac{\cos^5 x}{\sin^5 x + \cos^5 x} dx = \frac{\pi}{4}$$

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5. Prove that:  $\int_0^{\pi/2} \frac{1}{1 + \tan^3 x} = \frac{\pi}{4}$

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6. Prove that :  $\int_0^{\pi/2} \frac{\sin x - \cos x}{1 + \sin x \cos x} dx = 0$ " (ii) Prove that " :  
 $\int_0^{\pi/2} \sin 2x \cdot \log(\tan x) dx = 0$

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7. Prove that :  $\int_0^{\pi} x \cos^2 x dx = \frac{\pi^2}{4}$

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8. Prove that :  $\int_0^a \frac{\sqrt{x}}{\sqrt{x} + \sqrt{a-x}} dx = \frac{a}{2}$

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9. Prove that :  $\int_0^\pi \sin^2 x \cdot \cos x dx = 0$

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10. Prove that :

$$\int_0^{\pi/2} (\sin x - \cos x) \log(\sin^3 x + \cos^3 x) dx = 0$$

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11. Prove that :  $\int_2^7 \frac{\sqrt{x}}{\sqrt{9-x} + \sqrt{x}} dx = \frac{5}{2}$

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12. Prove that : 
$$\int_0^{\pi} \frac{x \sin x}{1 + \cos^2 x} dx = \frac{\pi^2}{4}$$

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13. Prove that : 
$$\int_0^{\pi/2} \frac{x}{\sin x + \cos x} dx = \frac{\pi}{4\sqrt{2}} \log \left| \frac{\sqrt{2} + 1}{\sqrt{2} - 1} \right|$$

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14. Prove that 
$$\int_0^{\frac{\pi}{2}} \frac{\sin^2 x}{1 + \sin x \cos x} dx = \frac{\pi}{3\sqrt{3}}$$

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15. Evaluate:  $\int_0^1 (1-x)^{3/2} dx$



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



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17. Evaluate:  $\int_0^1 x(1-x)^5 dx$



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18. Evaluate:  $\int_0^4 x(4-x)^{3/2} dx$



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19. Prove that : (i)  $\int_{-\pi}^{\pi} x^{10} \sin^7 x dx = 0$

(ii)  $\int_{-\pi}^{\pi} (\sin^{25} x + x^{75}) dx = 0$

(iii)  $\int_{-\pi}^{\pi} e^{|x|} dx = 2(e - 1)$

(iv)  $\int_{-\pi/2}^{\pi/2} \sin^9 x dx = 0$



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20.  $\int_0^{\pi} x \frac{\tan x}{\sec x + \cos x} dx = \frac{\pi^2}{4}$



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21. Evaluate :  $\int_{-\pi/2}^{\pi/2} |\sin x| dx$



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22. Evaluate :  $\int_0^8 |x - 5| dx$

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23. Evaluate :  $\int_{-\pi/4}^{\pi/4} |\sin x| dx$

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24. If  $f(x) = \begin{cases} 2x + 1.1 & \leq x \leq 2, \\ x^2 + 1.2 & \leq x \leq 3 \end{cases}$ , then evaluate

$\int_1^3 f(x) dx.$

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25. if  $f(x) = \begin{cases} 3x + 4, & 0 \leq x \leq 2 \\ 5x, & 2 \leq x \leq 3 \end{cases}$ , then evaluate

$$\int_0^3 f(x) dx.$$

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26. Prove that:  $\int_0^{\pi} \frac{x}{a^2 \cos^2 x + b^2 \sin^2 x} dx = \frac{\pi^2}{2ab}$

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27.  $\int_0^{\pi} \frac{e^{\cos x}}{e^{\cos x} + e^{-\cos x}} dx =$

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28. Prove that:  $\int_0^{\pi/2} \frac{x \sin x \cos x}{\sin^4 x + \cos^4 x} dx = \frac{\pi}{16}$



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## Exercise 7q

1.  $\int_2^4 x dx$



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2.  $\int_0^3 (x^2 + 1) dx$



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3.  $\int_1^4 (2x^2 + 1) dx$



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$$4. \int_1^5 (x^2 - 2x) dx$$



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$$5. \int_0^2 e^x dx$$



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$$6. \int_{-1}^2 e^{-x} dx$$



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$$7. \int_a^b \sin x dx$$



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8.  $\int_a^b \cos x dx$

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## Exercise 7r

1.  $\int \sqrt{1 + \sin 2x} dx$

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

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

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

D.

**Answer: B**



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2.  $\int \frac{3 - 4 \sin x}{\cos^2 x} dx = ?$

A.  $4 \tan x + 4 \sec x + c$

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

C.  $4 \tan x + 3 \sec x + c$

D.

**Answer: A**



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3.  $\int \frac{e^{2x} - 1}{e^{2x} + 1} dx = ?$

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

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

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

D.

**Answer: D**



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4.  $\int \frac{1}{\sin^2 x \cos^2 x} dx = ?$

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

B.  $\sec x + \cos ecx + c$

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

D.

**Answer: B**



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

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

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

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

D.  $2(1 + \cos x) + c$

**Answer: C**



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6. The value of  $\int \tan^3(2x)\sec(2x)dx$  is equal to:

A.  $\frac{1}{2}\sec^3 2x + \frac{1}{2}\sec 2x + c$

B.  $\frac{1}{6}\sec^3 2x - \frac{1}{2}\sec 2x + c$

C.  $\frac{1}{6}\sec^3 2x + \frac{1}{2}\sec 2x + c$

D.

**Answer: C**



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7. Write a value of  $\int e^x (\sin x + \cos x)dx$

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



B.  $-e^x \sin x + c$

C.  $-e^x \cos x + c$

D.

**Answer: A**



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8.  $\int \cos(\log x) dx$

A.  $\frac{x}{2} [\sin(\log x) + \cos(\log x)] + c$

B.  $\frac{x}{2} [\sin(\log x) - \cos(\log x)] + c$

C. None of the above

D.

**Answer: B**



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9.  $\int \frac{\tan^{-1} x}{1+x^2} dx = ?$

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

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

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

D.

**Answer: A**



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10.  $\int \frac{e^{m \tan^{-1} x}}{1+x^2} dx = ?$

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

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

C. None of these

D.

**Answer: B**



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11.  $\int \left( \frac{\sin(x - \alpha)}{\sin(x + \alpha)} \right) dx$

A.  $x \cos 2\alpha + \sin 2\alpha \log |\sin(x + \alpha)| + c$

B.  $x \cos 2\alpha - \sin 2\alpha \log |\sin(x + \alpha)| + c$

C. None of the above

D.

**Answer: C**



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12.  $\int \sin^3 x \cos^3 x dx = ?$

A.  $\frac{1}{4} \sin^4 x + \frac{1}{6} \sin^6 x + c$

B.  $\frac{1}{4} \cos^4 x - \frac{1}{6} \cos^6 x + c$

C. none of the above

D.

**Answer: A**



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

A.  $x \frac{\tan(x)}{2} + 2 \frac{\log \cos(x)}{2} + c$

B.  $x \frac{\tan(x)}{2} + 2 \frac{\log \sin(x)}{2} + c$

C. None of the above

D.

**Answer: B**



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14.  $\int \frac{1 - \cos x}{1 + \cos x} dx = ?$

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

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

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

D. none of these

**Answer: A**

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15.  $\int \frac{x^2}{x^2 + 4} dx = ?$

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

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

C. None of the above

D.

**Answer: C**

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16.  $\int_{-2}^2 X \sin^{10} x dx = ?$

A. -2

B. 4

C. None of the above

D.

**Answer: D**



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17.  $\int_{-4}^4 \log\left(\frac{7-x}{2+x}\right) dx = ?$

A. 4

B. -4

C. 0

D. 1

**Answer: C**



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18.  $\int_2^8 |x - 5| dx = ?$

A. 9

B. 10

C. 11

D.

**Answer: B**





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19.  $\int_0^1 x(1-x)^n dx = ?$

A.  $\frac{1}{(n+1)(n+2)}$

B.  $\frac{1}{n(n+2)}$

C.  $\frac{1}{(n+1)(n+3)}$

D.

**Answer: B**



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20.  $\int_0^1 \sqrt{\frac{1-x}{1+x}} dx = ?$

A.  $\frac{\pi}{2} + 1$

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

C. None of these

D.

**Answer: C**



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21.  $\int_0^1 \frac{x}{\sqrt{1+x^2}} dx = ?$

A.  $\sqrt{2} - 1$

B.  $\sqrt{2}$

C.  $-\sqrt{2}$

D.

**Answer: B**



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22.  $\int_0^{\pi/2} x \sin \cos x dx = ?$

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

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

C.  $\frac{\pi}{12}$

D.

**Answer: C**



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23.  $\int_0^{\pi/4} \log(1 + \tan x) dx = ?$

A.  $\frac{\pi}{4} \log 2$

B.  $\frac{\pi}{6} \log 2$

C.  $\frac{\pi}{8} \log 2$

D.

**Answer: D**



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24.  $\int_0^1 |5x - 3| dx = ?$

A.  $-\frac{13}{10}$

B.  $\frac{3}{10}$

C.  $-\frac{3}{10}$

D.

**Answer: A**



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25. if  $f(x) = \begin{cases} 3x + 4, & 0 \leq x \leq 2 \\ 5x, & 2 \leq x \leq 3 \end{cases}$ , then  $\int_0^3 f(x) dx = ?$

A.  $\frac{53}{2}$

B.  $\frac{55}{2}$

C.  $\frac{57}{2}$

D.

**Answer: B**



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## Exercise 7s

1.

if  $\int (\sin 2x - \cos 2x) dx = \frac{1}{\sqrt{2}} \sin(2x - k) + c$  then  $k = ?$

A.  $-\frac{5\pi}{4}$

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

C.  $-\frac{\pi}{4}$

D.

**Answer: A**[View Text Solution](#)

2.  $\int \frac{1}{\sqrt{\sin^3 x \cos x}} dx = ?$

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

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

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

D.

**Answer: D**



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

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

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

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

D.

**Answer: D**



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

A.  $\log\{\cos ecx(\sec x + \tan x)\} + c$

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

C. None of the above

D.

**Answer: C**



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

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

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

C. None of the above

D.

**Answer: A**



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6.  $\int \log(x^2 + a^2) dx = ?$

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

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

C. None of the above

D.

**Answer: B**



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7.  $\int \frac{1 - \sin x}{1 - \cos x} dx = ?$

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

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

C. None of the above

D.

**Answer: C**



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

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

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

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

D.

**Answer: B**



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9.  $\int \frac{x^2}{(a+bx)^2} dx = ?$

A.  $\frac{-x^2}{b(a+bx)} + \frac{2}{b^2} \left[ x - \frac{a}{b} \log(a+bx) \right] + c$

B.  $\frac{-x^2}{b(a+bx)} - \frac{2}{b^2} \left[ x - \frac{a}{b} \log(a+bx) \right] + c$

C. None of the above

D.

**Answer: B**



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

A.  $\log(x-1) - \log(x^3-1) + c$

B.  $\log(x^3-1) + \log(x-1) + c$

C. None of the above

D.

**Answer: C**



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11. integrate  $\int_0^{2\pi} e^x \cdot \sin\left(\frac{\pi}{4} + \frac{x}{2}\right) dx$

A. 0

B. -1

C. none of these

D.

**Answer: B**



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12.  $\int_0^{1/2} \frac{x \sin^{-1} x}{\sqrt{1-x^2}} dx = ?$

A.  $\frac{\pi\sqrt{3}}{12} + \frac{1}{2}$

B.  $\frac{\pi\sqrt{3}}{12} - \frac{1}{2}$

C.  $\frac{\pi\sqrt{3}}{12} - \frac{1}{2}$

D.

**Answer: A**



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13.  $\int_0^{\pi/4} \sqrt{\cot x} dx = ?$

A.  $\frac{\pi\sqrt{2}}{4} + \frac{1}{\sqrt{2}} \log(\sqrt{2} - 1)$

B.  $\frac{-\pi\sqrt{2}}{4} - \frac{1}{\sqrt{2}} \log(\sqrt{2} - 1)$

C.  $\frac{\pi\sqrt{2}}{4} - \frac{1}{\sqrt{2}}\log(\sqrt{2} - 1)$

D.

**Answer: D**



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14.  $\int_0^1 \cot^{-1}(1 - x + x^2) dx = ?$

A.  $\frac{\pi}{2} + \log 2$

B.  $\frac{\pi}{2} - \log 2$

C.  $-\frac{\pi}{2} - \log 2$

D.

**Answer: C**



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15. Evaluate  $\int_0^{\frac{\pi}{4}} (\sqrt{\tan x} + \sqrt{\cot x}) dx$

A.  $-\frac{\pi}{\sqrt{2}}$

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

C.  $-\frac{\pi}{2}$

D.

**Answer: A**



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16.  $\int_0^{\pi/2} \frac{\sin x - \cos x}{1 + \sin x \cos x} dx = ?$

A. 0



B. 1

C. None of the above

D.

**Answer: B**



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17.  $\int_0^{\pi/2} \operatorname{cosec} \left( x - \frac{\pi}{3} \right) \operatorname{cosec} \left( x - \frac{\pi}{6} \right) dx = ?$

A.  $-\log 3$

B.  $-2 \log 3$

C.  $2 \log 3$

D.

**Answer: C**



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18. Evaluate:  $\int_0^{\pi/2} \frac{1}{(a^2 \cos^2 x + b^2 \sin^2 x)^2} dx$

A.  $\frac{\pi(a^2 + b^2)}{4a^3b^3}$

B.  $\frac{\pi(a^2 + b^2)}{4a^2b^2}$

C. None of the above

D.

**Answer: B**



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19. Prove that:  $\int_0^{\pi/2} \log|\tan x + \cot x| dx = \pi(\log)_e 2$

A.  $-\pi \log 2$

B.  $\pi \log 2$

C.  $\frac{\pi}{2} \log 2$

D.

**Answer: B**



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20.  $\int_0^{\pi} \sin\left(n + \frac{1}{2}\right)x \cdot \operatorname{cosec} \frac{x}{2} dx = ?$

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

B.  $\pi$

C.  $2\pi$

D.

**Answer: C**



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## Exercise 7.1

**1.**  $\sin 2x$



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**2.**  $\cos 3x$



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**3.**  $e^{2x}$



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4.  $(ax + b)^2$



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5.  $\sin 2x - 4e^{3x}$



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6.  $\int(4e^{3x} + 1) dx$



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



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8.  $\int (ax^2 + bx + c) dx$



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9.  $\int (2x^2 + e^x) dx$



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10.  $\int \left(\sqrt{x} - \frac{1}{\sqrt{x}}\right) dx$



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

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12.  $\int \frac{x^3 + 3x + 4}{\sqrt{x}} dx$

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13. Find the integral  $\int \frac{x^3 - x^2 + x - 1}{x - 1} dx$

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14.  $\int (1 - x)\sqrt{x} dx$

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15. Find the integral  $\int \sqrt{x}(3x^2 + 2x + 3) dx$

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16.  $\int (2x - 3 \cos x + e^x) dx$

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17. Find the integral  $\int (2x^2 - 3 \sin x + 5\sqrt{x}) dx$

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18. Find the integral  $\int \sec x (\sec x + \tan x) dx$





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$$19. \int \frac{\sec^2 x}{\operatorname{cosec}^2 x} dx$$



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$$20. \int \frac{2 - 3 \sin x}{\cos^2 x} dx$$



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21. The anti derivative of  $\left(\sqrt{x} + \frac{1}{\sqrt{x}}\right)$  equals (A)

(A)  $\frac{1}{3}x^{\frac{1}{3}} + 2x^{\frac{1}{2}} + C$  (B)  $\frac{2}{3}x^{\frac{2}{3}} + \frac{1}{2}x^2 + C$  (C)  $\frac{2}{3}x^{\frac{3}{2}} + 2x^{\frac{1}{2}} + C$

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

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

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

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

D.

Answer: c



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22. If  $\frac{d}{dx}f(x) = 4x^3 - \frac{3}{x^4}$  such that  $f(2) = 0$ . Then  $f(x)$  is (A)

$x^4 + \frac{1}{x^3} - \frac{129}{8}$  (B)  $x^3 + \frac{1}{x^4} + \frac{129}{8}$  (C)  $x^4 + \frac{1}{x^3} + \frac{129}{8}$  (D)

$x^3 + \frac{1}{x^4} - \frac{129}{8}$

A.  $x^3 + \frac{1}{x^4} + \frac{129}{8}$

B.  $x^4 + \frac{1}{x^3} - \frac{129}{8}$

C.  $x^3 + \frac{1}{x^4} + \frac{129}{8}$

D. None Of These

**Answer: B**

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## Exercise 7.2

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

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

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3.  $\frac{1}{x + x \log x}$

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4.  $\sin x \sin(\cos x)$

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5.  $\sin(ax + b)\cos(ax + b)$

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6.  $\sqrt{ax + b}$

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7.  $x\sqrt{x+2}$

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8.  $x\sqrt{1+2x^2}$

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9. Integrate the functions  $(4x+2)\sqrt{x^2+x+1}$

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10.  $\frac{1}{x-\sqrt{x}}$

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11. Integrate the functions  $\frac{x}{\sqrt{x+4}}$ ,  $x > 0$

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12. Integrate the functions  $(x^3 - 1)^{\frac{1}{3}} x^5$

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13. Integrate the functions  $\frac{x^2}{(2 + 3x^3)^3}$

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14. Integrate the functions  $\frac{1}{x(\log x)^m}$ ,  $x > 0$

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15. Integrate the functions  $\frac{x}{9 - 4x^2}$



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16.  $e^{2x+3}$



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17.  $\frac{x}{e^{x^2}}$



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18. Integrate the functions  $\frac{e^{\tan^{-1}(( - 1)s)}}{1 + x^2}$



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19. Integrate the functions  $\frac{e^{2x} - 1}{e^{2x} + 1}$

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20. Integrate the functions  $\frac{e^{2x} - e^{-2x}}{e^{2x} + e^{-2x}}$

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21. Integrate the function  $\tan^2(2x - 3)$

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22. Evaluate:  $\int \sec^2(7 - 4x) dx$



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23.  $\frac{\sin^{-1} x}{\sqrt{1-x^2}}$

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24.  $\frac{2 \cos x - 3 \sin x}{6 \cos x + 4 \sin x}$

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25. Integrate the functions  $\frac{1}{\cos^2 x (1 - \tan x)^2}$

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26. Integrate the functions  $\frac{\cos \sqrt{x}}{\sqrt{x}}$

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27.  $\sqrt{\sin 2x} \cos 2x$

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28.  $\frac{\cos x}{\sqrt{1 + \sin x}}$

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29. Integrate the functions  $\cot x \log \sin x$

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30.  $\frac{\sin x}{1 + \cos x}$



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31. Integrate the functions  $\frac{\sin x}{(1 + \cos x)^2}$



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32. Integrate the functions  $\frac{1}{1 + \cot x}$



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33.  $\frac{1}{1 - \tan x}$



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34. Integrate the functions  $\frac{\sqrt{\tan x}}{\sin x \cos x}$

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

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36. Integrate the functions  $\frac{(1 + x)(x + \log x)^2}{x}$

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37.  $\frac{x^3 \sin(\tan^{-1} x^4)}{1 + x^8}$



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38.  $\int \frac{10x^9 + 10x^x (\log)_{e^{10}} dx}{x^{10} + 10^x}$  equals

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

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

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

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

Answer: D



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

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

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

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

D.

**Answer: b**

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## Exercise 7.3

1. Find the integrals of the functions  $\sin^2(2x + 5)$

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2. Integrate the functions  $\sin 3x \cot 4x$



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3. Integrate the functions  $\cos 2x \cos 4x \cos 6x$



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4. Find the integrals of the functions  $s \in^3 (2x + 1)$



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5. Integrate the functions  $\sin^3 x \cos^3 x$



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6. Integrate  $\sin x \sin 2x \sin 3x$



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7.  $\sin 4x \sin 8x$



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8. Integrate the functions  $\frac{1 - \cos x}{1 + \cos x}$



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



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10. Integrate the function  $\sin^4 x$



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11. Integrate the function  $\cos^4 2x$



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12. Integrate the function  $\frac{\sin^2 x}{1 + \cos x}$



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13. Evaluate:  $\int \frac{\cos 2x - \cos 2\alpha}{\cos x - \cos \alpha} dx$



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14. Integrate the functions  $\frac{\cos x - \sin x}{1 + \sin 2x}$



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15. Integrate the function  $\tan^3 2x \sec 2x$



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16. Integrate the function  $\tan^4 x$



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17. Integrate the functions  $\frac{\sin^3 x + \cos^3 x}{\sin^2 x \cos^2 x}$



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18. Integrate the functions  $\frac{\cos 2x + 2 \sin^2 x}{\cos^2 x}$



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19. Integrate the functions  $\frac{1}{\sin x \cos^3 x}$



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20. Integrate the functions  $\frac{\cos 2x}{(\cos x + \sin x)^2}$



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21. Integrate the functions  $\sin^{-1}(\cos x)$



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22. Evaluate:  $\int \frac{1}{\cos(x - a)\cos(x - b)} dx$

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23. Integrate the functions  $\frac{1}{\cos(x - a)\cos(x - b)}$

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

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

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

D.

**Answer: a**

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24.  $\int \left( e^x \frac{1+x}{\cos^2(e^x)} dx \right)$  equals (A)  $-\cot(ex^x) + C$  (B)

$\tan(xe^x) + C$  (C)  $\tan(e^x) + C$  (D)  $\cot(e^x) + C$

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

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

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

D.

**Answer: b**

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## Exercise 7.4

1. Integrate:  $\frac{3x^2}{x^6 + 1}$



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2. Integrate the functions  $\frac{1}{\sqrt{1+4x^2}}$



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



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4. Integrate the functions  $\frac{1}{\sqrt{9-25x^2}}$



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5. Integrate the functions  $\frac{3x}{1 + 2x^4}$

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6.  $\frac{x^2}{1 + x^6}$

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7.  $\frac{x - 1}{\sqrt{x^2 - 1}}$

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8. Integrate the functions  $\frac{x^2}{\sqrt{x^6 + a^6}}$

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9. Integrate the functions  $\frac{\sec^2 x}{\sqrt{\tan^2 x + 4}}$

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10. Integrate the functions  $\frac{1}{\sqrt{x^2 + 2x + 2}}$

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11. Integrate the functions  $\frac{1}{9x^2 + 6x + 5}$

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12. Integrate the functions  $\frac{1}{\sqrt{7 - 6x - x^2}}$

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13. 
$$\frac{1}{\sqrt{(x-1)(x-2)}}$$

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14. Integrate the functions 
$$\frac{1}{\sqrt{8+3x-x^2}}$$

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15. Integrate the functions 
$$\frac{1}{\sqrt{(x-a)(x-b)}}$$

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16. Integrate the functions 
$$\frac{4x+1}{\sqrt{2x^2+x-3}}$$



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



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18. Integrate the functions  $\frac{5x - 2}{1 + 2x + 3x^2}$



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



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20. Integrate the functions  $\frac{x + 2}{\sqrt{4x - x^2}}$

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21. Integrate the functions  $\frac{x + 2}{\sqrt{x^2 + 2x + 3}}$

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22. Integrate the functions  $\frac{x + 3}{x^2 - 2x - 5}$

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

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24.  $\int \frac{dx}{x^2 + 2x + 2}$  equals (A)  $x \tan^{-1}(x + 1) + C$  (B)

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

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

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

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

D.

Answer: b



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25.  $\int \frac{dx}{\sqrt{9x - 4x^2}}$  equals (A)  $\frac{1}{9} \sin^{-1} \left( \frac{9x - 8}{8} \right) + C$  (B)

$\frac{1}{2} \sin^{-1} \left( \frac{8x - 9}{9} \right) + C$  (C)  $\frac{1}{3} \sin^{-1} \left( \frac{9x - 8}{8} \right) + C$  (D)

$$\frac{1}{2} \sin^{-1} \left( \frac{9x - 8}{9} \right) + C$$

A.  $\frac{1}{2} \sin^{-1} \left( \frac{8x - 9}{9} \right) + C$

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

C.  $\frac{1}{2} \sin^{-1} \left( \frac{9x - 8}{9} \right) + C$

D.

**Answer: b**



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## Exercise 7.5

1. Integrate,  $\frac{x}{(x + 1)(x + 2)}$



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



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



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$$4. \frac{x}{(x - 1)(x - 2)(x - 3)}$$



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$$5. \int \frac{2x}{x^2 + 3x + 2} dx$$



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6. Integrate  $\frac{1 - x^2}{x(1 - 2x)}$



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7.

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



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



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9.  $\int \frac{3x + 5}{x^3 - x^2 - x + 1} \cdot dx$



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



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11. Integrate the rational functions  $\frac{5x}{(x + 1)(x^2 - 4)}$



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12.  $\frac{x^3 + x + 1}{x^2 - 1}$



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



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



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15.  $\frac{1}{x^4-1}$



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16. Integrate the rational functions  $\frac{1}{x(x^n+1)}$  [Hint: multiply numerator and denominator by  $x^{n-1}$  and put  $x^n = t$ ]



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17. Integrate the rational functions  $\frac{\cos x}{(1 - \sin x)(2 - \sin x)}$

[Hint: Put  $s \in x = t$ ]

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18.  $\int \frac{(x^2 + 1)(x^2 + 2)}{(x^2 + 3)(x^2 + 4)} dx$

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

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20.  $\int \frac{1}{x(x^4 - 1)}$



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21.  $\frac{1}{(e^x - 1)}$



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22.  $\int \frac{x dx}{(x - 1)(x - 2)}$  equals :

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

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

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

D.

**Answer: B**



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

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

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

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

D.

**Answer: A**



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1. integrate the function  $x \sin x$

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2. Evaluate  $\int x \sin 3x dx$ .

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3.  $x^2 e^x$

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4.  $x \log x$

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5.  $x \log 2x$



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6.  $x^2 \log x$



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



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



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9. Integrate  $x \cos^{-1} x$



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10. Evaluate:  $\int (\sin^{-1} x)^2 dx$



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



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12. Integrate the functions  $x \sec^2 x$

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

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

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15.  $(x^2 + 1)\log x$

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16. Example:  $e^x(\sin x + \cos x)dx$





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$$17. \int \frac{x e^x}{(1+x)^2} dx$$



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$$18. \int e^x \left( \frac{1 + \sin x}{1 + \cos x} \right) dx$$



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$$19. \text{Integrate the functions } e^x \left( \frac{1}{x} - \frac{1}{x^2} \right)$$



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20. Evaluate  $\int \frac{(x - 3)e^x}{(x - 1)^3} dx$



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21. Integrate the functions  $e^{2x} \sin x$



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22.  $\int_0^1 \sin^{-1} \left( \frac{2x}{1+x^2} \right) dx$



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23. Choose the correct answer  $\int x^2 e^{x^3} dx$  equals (A)  $\frac{1}{3} e^{x^3} + C$  (B)  $\frac{1}{3} e^{x^2} + C$  (C)  $\frac{1}{2} e^{x^3} + C$  (D)

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

A.  $\frac{1}{3}e^{x^2} + C$

B.  $\frac{1}{2}e^{x^3} + C$

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

D.

**Answer: a**



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**24. Evaluate:**  $\int e^x \sec x (1 + \tan x) dx$

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

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

C.  $e^x \tan x + C$

D.

**Answer: b**

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## Exercise 7.7

1. Integrate the functions  $\sqrt{4 - x^2}$

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2. Integrate the functions  $\sqrt{1 - 4x^2}$

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3. Integrate the functions  $\sqrt{x^2 + 4x + 6}$



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4. Integrate the functions  $\sqrt{x^2 + 4x + 1}$



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5. Integrate the functions  $\sqrt{1 - 4x - x^2}$



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6. Integrate the functions  $\sqrt{x^2 + 4x - 5}$



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



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8. Integrate the functions  $\sqrt{x^2 + 3x}$



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9. Integrate the functions  $\sqrt{1 + \frac{x^2}{9}}$



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10. Choose the correct answer  $\int \sqrt{a + x^2} dx$  is equal to (A)

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

$$\frac{2}{3}(1+x^2)^{\frac{3}{2}} + C \quad (C) \qquad \frac{2}{3}x(1+x^2)^{\frac{3}{2}} + C \quad (D)$$

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

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

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

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

D.

**Answer: A**



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11. Choose the correct answer  $\int \sqrt{x^2 - 8x + 7} dx$  (A)

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

(B)

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

(C)

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

(D)  $\frac{1}{2}(x-4)\sqrt{x^2-8x+7}$ -

A.  $\frac{1}{2}(x + 4)\sqrt{x^2 - 8x + 7}$

$$+ 9\log|x + 4 + \sqrt{x^2 - 8x + 7}| + C$$

B.  $\frac{1}{2}(x - 4)\sqrt{x^2 - 8x + 7}$

$$- 3\sqrt{2}\log|x - 4 + \sqrt{x^2 - 8x + 7}| + C$$

C.  $\frac{1}{2}(x - 4)\sqrt{x^2 - 8x + 7}$

$$- \frac{9}{2}\log|x - 4 + \sqrt{x^2 - 8x + 7}| + C$$

D.

**Answer: D**



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## Exercise 7.8

1.  $\int_a^b x dx$



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2.  $\int_0^5 (x + 1) dx$



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3.  $\int_2^3 x^2 dx$



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4.  $\int_1^4 (x^2 - x) dx$

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5.  $\int_{-1}^1 e^x dx$

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6. Find is sum of limit  $\int_0^4 (x + e^{2x}) dx$

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## Exercise 7.9

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



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2. Evaluate:  $\int_2^3 \frac{1}{x} dx$



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3. Evaluate the definite integrals  $\int 12(4x^3 - 5x^2 + 6x + 9) dx$



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4.  $\int_0^{\frac{\pi}{4}} \sin 2x dx$



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5.  $\int_0^{\frac{\pi}{2}} \cos 2x dx$



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6. Evaluate the definite integrals  $\int 45e^x dx$



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7. Evaluate the definite integrals  $\int_0^{\frac{\pi}{4}} \tan x dx$



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8.  $\int_{\frac{\pi}{6}}^{\frac{\pi}{4}} \operatorname{cosec} x dx$





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9. 
$$\int_0^1 \frac{dx}{\sqrt{(1-x^2)}}$$



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10. Evaluate : 
$$\int_0^1 \frac{dx}{1+x^2}$$



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11. 
$$\int_2^3 \frac{dx}{x^2-1}$$



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$$12. \int_0^{\frac{\pi}{2}} \cos^2 x dx$$

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$$13. \int_2^3 \frac{x dx}{x^2 + 1}$$

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$$14. \int_0^1 \frac{2x + 3}{5x^2 + 1} dx$$

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$$15. \int_0^1 x e^{x^2} dx$$

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16.  $\int_1^2 \frac{5x^2}{x^2 + 4x + 3} dx$

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17. Evaluate the definite integrals  $\int_0^{\frac{\pi}{4}} (2 \sec^2 x + x^3 + 2) dx$

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18. Evaluate the definite integrals  $\int_0^{\pi} \left( \frac{\sin^2 x}{2} - \frac{\cos^2 x}{2} \right) dx$

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19. Evaluate the definite integrals  $\int_0^2 \frac{6x + 3}{x^2 + 4} dx$

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20.  $\int_0^1 \left( xe^x + \sin\left(\pi \frac{x}{4}\right) \right) dx$



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21. Choose the correct answer  $\int 1\sqrt{3} \frac{dx}{1+x^2}$  equals (A)  $\frac{\pi}{3}$  (B)  $\frac{2\pi}{3}$  (C)  $\frac{\pi}{6}$  (D)  $\frac{\pi}{12}$

A.  $\frac{2\pi}{3}$

B.  $\frac{\pi}{6}$

C.  $\frac{\pi}{12}$

D.

Answer: d



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22. Choose the correct answer  $\int_0^{\frac{2}{3}} \frac{dx}{4 + 9x^2}$  (A)  $\frac{\pi}{6}$  (B)  $\frac{\pi}{12}$  (C)  $\frac{\pi}{24}$  (D)  $\frac{\pi}{4}$

A.  $\frac{\pi}{12}$

B.  $\frac{\pi}{24}$

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

D.

**Answer: c**



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**Exercise 7.10**

1.  $\int_0^1 \frac{x}{x^2 + 1} dx$



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2.  $\int_0^{\frac{\pi}{2}} \sqrt{\sin \phi \cos^5 \phi} d\phi$



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3.  $\int_0^1 \sin^{-1} \left( \frac{2x}{1+x^2} \right) dx$



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4.  $\int_0^2 x \sqrt{x+2} dx$  (put  $x+2 = t^2$ )



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

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6. Evaluate the integrals  $\int_0^2 \frac{dx}{x + 4 - x^2}$

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7. Evaluate the integrals  $\int -11 \frac{dx}{x^2 + 2x + 5}$

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8.  $\int_1^2 \left( \frac{1}{x} - \frac{1}{2x^2} \right) e^{2x} dx$

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9. Choose the correct answer The value of the integral

$$\int_{\frac{1}{3}}^1 \frac{(x - x^3)^{\frac{1}{3}}}{x^4} dx \text{ is (A) 6 (B) 0 (C) 3 (D) 4}$$

A. 0

B. 3

C. 4

D.

**Answer: a**

10. If  $f(x) = \int_0^x t \sin t \, dt$  tehn  $f(x)$  is

A.  $x \sin x$

B.  $x \cos x$

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

D.

**Answer: b**



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## Exercise 7.11

1.  $\int_0^{\frac{\pi}{2}} \cos^2 x dx$



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



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



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$$4. \int_0^{\frac{\pi}{2}} \frac{\cos^5 x dx}{\sin^5 x + \cos^5 x}$$



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$$5. \int_{-5}^5 |x + 2| dx$$



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6.  $\int_2^8 |x - 5| dx$



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7. Find the value of  $\int_0^1 x(1 - x)^n dx$



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8. Evaluate :  $\int_0^{\frac{\pi}{4}} \log(1 + \tan x) dx$ .



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9.  $\int_0^2 x\sqrt{2 - x} dx$

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10. Evaluate :  $\int_0^{\frac{\pi}{2}} (2 \log \sin x - \log \sin 2x) dx$

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11.  $\int_{-\frac{\pi}{2}}^{\frac{\pi}{2}} \sin^2 x dx$

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12.  $\int_0^{\pi} \frac{x}{1 + \sin x} dx$

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13.  $\int_{-\frac{\pi}{2}}^{\frac{\pi}{2}} \sin^7 x dx$



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14. Evaluate:  $\int_0^{2\pi} \cos^5 x dx$



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15.  $\int_0^{\frac{\pi}{2}} \frac{\sin x - \cos x}{1 + \sin x \cos x} dx$



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16.  $\int_0^{\pi} \log(1 + \cos x) dx$ .



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17. By using the properties of definite integrals, evaluate the

integrals  $\int_0^a \frac{\sqrt{x}}{\sqrt{x} + \sqrt{a-x}} dx$

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18.  $\int_0^a |x - 1| dx$

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19. Show that  $\int_0^a f(x)g(x) dx = 2 \int_0^a f(x) dx$  if  $f$  and  $g$

defined as  $f(x) = f(a-x)$  and

$$g(x) + g(a-x) = 4$$

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20. The value of  $\int_{-\frac{\pi}{2}}^{\frac{\pi}{2}} (x^3 + x \cos x + \tan^5 x + 1) dx$

A. 2

B.  $\pi$

C. 1

D.

**Answer: C**



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21. Evaluate:  $\int_0^{\frac{\pi}{2}} \log \left( \frac{4 + 3 \sin x}{4 + 3 \cos x} \right) dx$

A.  $\frac{3}{4}$

B. 0

C.  $-2$

D.

**Answer: C**

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## Miscellaneous Exercise

1. Integrate the function  $\frac{1}{x - x^3}$

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2.  $\int \frac{1}{\sqrt{x+a} + \sqrt{x+b}} dx$

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3.  $\frac{1}{x\sqrt{ax - x^2}}$  [Hint : Put  $x = \frac{a}{t}$ ]

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4.  $\int \frac{1}{x^2(x^4 + 1)^{\frac{3}{4}}} dx$

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

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6. Integrate the functions  $\frac{5x}{(x + 1)(x^2 + 9)}$

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

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8.  $\int \frac{e^{5 \log x} - e^{4 \log x}}{e^{3 \log x} - e^{2 \log x}} dx$

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9.  $\frac{\cos x}{\sqrt{4 - \sin^2 x}}$

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

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11. Integrate the functions  $\frac{1}{\cos(x + a)\cos(x + b)}$

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12.  $\frac{x^3}{\sqrt{1 - x^8}}$

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13.  $\int \frac{e^x}{(1 + e^x)(2 + e^x)} dx$

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

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

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

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

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

**Answer: C**

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15.  $\cos^3 x e^{\log \sin x}$

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16. Evaluate:  $\int e^{3 \log x} (x^4 + 1)^{-1} dx$



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17. Integrate the functions  $f'(ax + b)[f(ax + b)]^n$



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18. Integrate the functions  $\frac{1}{\sqrt{\sin^3 x \sin(x + \alpha)}}$



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19. Integrate the functions  $\frac{\sin^{-1} \sqrt{x} - \cos^{-1} \sqrt{x}}{\sin^{-1} \sqrt{x} + \cos^{-1} \sqrt{x}}, x \in [0, 1]$



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20.  $\int \sqrt{\frac{1 - \sqrt{x}}{1 + \sqrt{x}}} dx =$

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

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

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



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24. Integrate the functions  $\frac{\sqrt{x^2 + 1} [\log(x^2 + 1) - 2 \log x]}{x^4}$

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

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26.  $\int_0^{\frac{\pi}{2}} \frac{x \sin x \cos x}{\cos^4 x + \sin^4 x} dx =$

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$$27. \int_0^{\frac{\pi}{2}} \frac{\cos^2 x dx}{\cos^2 x + 4 \sin^2 x}$$



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$$28. \int_{\frac{\pi}{6}}^{\frac{\pi}{3}} \frac{\sin x + \cos x}{\sqrt{\sin 2x}} dx$$



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$$29. \int_0^1 \frac{1}{\sqrt{1+x} - \sqrt{x}} dx$$



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$$30. \int_0^{\frac{\pi}{4}} \frac{\sin x + \cos x}{9 + 16 \sin 2x} dx$$

A.  $\frac{1}{40} \log 9$

B.  $\frac{1}{20} \log 9$

C.  $\frac{1}{40} \log 3$

D. None of these

**Answer: A**

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31.  $\int_0^{\frac{\pi}{2}} \sin 2x \tan^{-1}(\sin x) dx$

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32. Evaluate:  $\int_0^{\pi} \frac{x \tan x}{\sec x + \tan x} dx$

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33. Evaluate the definite integrals

$$\int 14[|x - 1| + |x - 2| + |x - 3|] dx$$

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$$34. \int_1^3 \frac{dx}{x^2(x+1)} = \frac{2}{3} + \log \frac{2}{3}$$

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$$35. \int_0^1 x e^x dx = 1$$

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$$36. \int_{-1}^1 x^{17} \cos^4 x dx = 0$$



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$$37. \int_0^{\frac{\pi}{4}} \sin^3 x dx = \frac{2}{3}$$



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$$38. \int_0^{\frac{\pi}{4}} 2 \tan^3 x dx = 1 - \log 2$$



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$$39. \int_0^1 \sin^{-1} x dx = \frac{\pi}{2} - 1$$



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40. Evaluate  $\int_0^1 e^{2-3x} dx$  as a limit of a sum.



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41.  $\int \frac{dx}{e^x + e^{-x}}$  is equal to

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

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

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

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

Answer: A



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

A.  $\log|\sin x + \cos x| + C$

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

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

D.

**Answer: b**

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43. If  $\left| \int_a^b f(x) dx \right| = \int_a^b |f(x)| dx$ ,  $a < b$ , then  $f(x) = 0$  has

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

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

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

D.

**Answer: N/A**



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44. The value of  $\int_0^1 \tan^{-1} \left( \frac{2x-1}{1+x-x^2} \right) dx$  is (A) 1 (B) 0 (C) -1

(D)  $\frac{\pi}{4}$

A. 0

B. -1

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

D.

**Answer: N/A**



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