



## MATHS

### BOOKS - A N EXCEL PUBLICATION

## INTEGRALS

#### Question Bank

1. Find the following integrals  $\int \frac{1}{x^n} dx$

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2. Find the following integrals  $\int \frac{x^3 - 1}{x^2} dx$

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3. Find the following integrals  $\int x^{\frac{2}{3}} + 1 dx$

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4. Find the following integrals  $\int (\sin x + \cos x) dx$

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5. Find the following integrals  $\int \cos ecx (\cos ecx + \cot x) dx$

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6. Find the following integrals  $\int \frac{1 - \sin x}{\cos^2 x} dx$

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

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8. Find the antiderivative (or integral) of the following functions by the method of inspection.  $\sin 2x$

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9. Find the antiderivative (or integral) of the following functions by the method of inspection.  $\cos 3x$

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**10.** Find the antiderivative (or integral) of the following functions by the method of inspection.  $e^{2x}$

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**11.** Find the antiderivative (or integral) of the following functions by the method of inspection.  $(ax + b)^2$

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**12.** Find the antiderivative (or integral) of the following functions by the method of inspection.  $\sin 2x - 4e^{3x}$

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13. Evaluate the following integrals  $\int(4e^{3x} + 1) dx$

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14. Evaluate the following integrals  $\int x^2 \left(1 - \frac{1}{x^2}\right) dx$

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15. Evaluate the following integrals  $\int(ax^2 + bx + c) dx$

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16. Evaluate the following integrals  $\int(2x^2 + e^x) dx$

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17. Evaluate the following integrals  $\int \left( \sqrt{x} - \frac{1}{\sqrt{x}} \right)^2 dx$

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18. Evaluate the following integrals:  $\int \frac{x^3 + 5x^2 - 4}{x^2} dx$

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19. Evaluate the following integrals:  $\int \frac{x^3 + 3x + 4}{\sqrt{x}} dx$

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20. Evaluate the following integrals  $\int \frac{x^3 - x^2 + x - 1}{x - 1} dx$

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

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22. Evaluate the following integrals  $\int \sqrt{x}(3x^2 + 2x + 3) dx$

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23. Evaluate the following integrals  $\int (2x - 3 \cos x + e^x) dx$

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24. Evaluate the following integrals  $\int (2x^2 - 3 \sin x + 5\sqrt{x}) dx$

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25. Evaluate the following integrals  $\int \sec x (\sec x + \tan x) dx$

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26. Evaluate the following integrals  $\int \frac{\sec^2 x}{\cos e c^2 x} dx$

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27. Evaluate the following integrals  $\int \frac{2 - 3 \sin x}{\cos^2 x} dx$

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28. Choose the correct answer from the bracket. The antiderivative of  $(\sqrt{x} + 1/\sqrt{x})$  equals

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

**Answer: C**



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**29.** Choose the correct answer from the bracket.

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

**Answer: A**

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30. Evaluate  $\int \cot x dx$

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31. Evaluate  $\int \sec x dx$

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32. Evaluate  $\int \cos ex dx$

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33. Integrate the following  $\int \frac{\sin \sqrt{x}}{\sqrt{x}} dx$

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34. Integrate the following  $\int \frac{\sin x}{\sin(x + a)} dx$

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35. Integrate the following  $\int \frac{1}{1 + \tan x} dx$

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36. Integrate the following functions  $\frac{2x}{1 + x^2}$

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37. Integrate the following functions  $\frac{(\log x)^2}{x}$

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38. Integrate the following functions  $\frac{1}{x + x \log x}$

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39. Integrate the following functions  $\sin x \sin(\cos x)$ .

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40. Integrate the following functions  $\sin(ax+b) \cos(ax+b)$ .

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41. Integrate the following functions  $\sqrt{ax + b}$

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42. Integrate the following functions  $x\sqrt{x+2}$

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43. Integrate the following functions  $x\sqrt{1+2x^2}$

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

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45. Integrate the following functions  $\frac{1}{x-\sqrt{x}}$

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

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

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

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

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

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51. Integrate the following functions  $e^{2x+3}$

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52. Integrate the following functions  $\frac{x}{e^{x^2}}$

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

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

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

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56. Integrate the following functions  $\tan^2(2x - 3)$

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57. Integrate the following functions  $\sec^2(7 - 4x)$

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58. Integrate the following functions:  $\frac{\sin^{-1} x}{\sqrt{1-x^2}}$

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59. Integrate the following functions  $\frac{2 \cos x - 3 \sin x}{6 \cos x + 4 \sin x}$

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

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

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62. Integrate the following functions  $\sqrt{\sin 2x} \cos 2x$

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63. Integrate the following functions  $\frac{\cos x}{\sqrt{1 + \sin x}}$

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64. Integrate the following functions  $\cot x \log(\sin x)$

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65. Integrate the following functions  $\frac{\sin x}{1 + \cos x}$ .

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

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67. Integrate the following functions  $1/(1+\cot x)$

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68. Integrate the following functions  $1/(1-\tan x)$

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

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

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

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72. Integrate the following functions  $\frac{x^3 \sin(\tan^{-1} x^4)}{1 + x^8}$

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73. Choose the correct answer  $\int \left( \frac{10x^9 + 10^x \log 10}{x^{10} + 10^x} \right) dx$

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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74. Choose the correct answer  $\int \frac{dx}{\sin^2 x \cos^2 x} = \dots$  a)  $\tan x + \cot x + c$  b)

$\tan x - \cot x + c$  c)  $\tan x \cot x + c$  d)  $\tan x - \cot 2x + c$

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

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

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

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

**Answer: B**



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75. Find  $\int \cos^2 x dx$

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76. Find  $\int \sin^2 x dx$

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77. Find  $\int \tan^2 x dx$

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78. Find  $\int \cot^2 x dx$

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79. Find  $\int \cos^3 x dx$

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80. Find  $\int \sin^3 x dx$

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81. Find  $\int \tan^3 x dx$

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82. Integrate the following functions:  $\sin^2(2x + 5)$

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83. Integrate the following functions:  $\sin 3x \cos 4x$

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84. Integrate the following functions:  $\cos 2x \cos 4x \cos 6x$

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85. Integrate the following functions:  $\sin^3(2x + 1)$

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86. Integrate the following functions:  $\sin^3 x \cos^3 x$

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87. Integrate the following functions:  $\sin x \sin 2x \sin 3x$

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88. Integrate the following functions:  $\sin 4x \sin 8x$

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89. Integrate the following functions:  $(1-\cos x)/(1+\cos x)$

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90. Integrate the following functions:  $\cos x/(1+\cos x)$

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91. Integrate the following functions:  $\sin^4 x$

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92. Integrate the following functions:  $\cos^4(2x)$

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93. Integrate the following functions:  $\frac{\sin^2 x}{1 + \cos x}$

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94. Integrate the following functions:  $\frac{\cos 2x - \cos 2\alpha}{\cos x - \cos \alpha}$

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95. Integrate the following functions:  $\frac{\cos x - \sin x}{1 + \sin(2x)}$

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96. Integrate the following functions:  $\tan^3 2x \sec(2x)$

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97. Integrate the following functions:  $\tan^4 x$

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98. Integrate the following functions:  $\frac{\sin^3 x + \cos^3 x}{\sin^2 x \cos^2 x}$

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99. Integrate the following functions:  $\frac{\cos 2x + 2 \sin^2 x}{\cos^2 x}$

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100. Integrate the following functions:  $\frac{1}{\sin x \cos^3 x}$

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101. Integrate the following functions:  $\frac{\cos(2x)}{(\cos x + \sin x)^2}$

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102. Integrate the following functions:  $\sin^{-1}(\cos x)$

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103. Integrate the following functions:  $1/(\cos(x-a) \cos(x-b))$



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104. Choose the correct answer  $\int \frac{\sin^2 x - \cos^2 x}{\sin^2 x \cos^2 x} dx$  a)  $\tan x + \cot x + c$   
b)  $\tan x + \operatorname{cosec} x + c$  c)  $\cot x - \tan x + c$  d)  $\tan x + \sec x + c$

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

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

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

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

Answer: A



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

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

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

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

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

**Answer: B**



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106. Integrate the following

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



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107. Evaluate the following integrals  $\int \frac{1}{9x^2 - 1} dx$

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108. Evaluate the following integrals  $\int \frac{1}{\sqrt{1 + 4x^2}} dx$

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109. Integrate the following functions  $\frac{3x^2}{x^6 + 1}$

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110. Integrate the following functions  $\frac{1}{\sqrt{1 + 4x^2}}$

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111. Integrate the following functions  $\frac{1}{\sqrt{(2-x)^2 + 1}}$

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112. Integrate the following functions  $\frac{1}{\sqrt{9 - 25x^2}}$

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113. Integrate the following functions  $\frac{3x}{1 + 2x^4}$

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114. Integrate the following functions  $\frac{x^2}{1 - x^6}$

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115. Integrate the following functions  $\frac{x - 1}{\sqrt{x^2 - 1}}$

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116. Integrate the following functions  $\frac{x^2}{\sqrt{x^6 + a^6}}$

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117. Integrate the following functions  $\frac{\sec^2 x}{\sqrt{\tan^2 x + 4}}$

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118. Integrate the following functions  $\frac{1}{\sqrt{x^2 + 2x + 2}}$

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119. Integrate the following functions  $\frac{1}{9x^2 + 6x + 5}$

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120. Integrate the following functions  $\frac{1}{\sqrt{7 - 6x - x^2}}$

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121. Integrate the following functions  $\frac{1}{\sqrt{(x - 1)(x - 2)}}$

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122. Integrate the following functions  $\frac{1}{\sqrt{8 + 3x - x^2}}$

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123. Integrate the following functions  $\frac{1}{\sqrt{(x-a)(x-b)}}$

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124. Integrate the following functions  $\frac{4x+1}{\sqrt{2x^2+x-3}}$

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125. Integrate the following functions  $\frac{x+2}{\sqrt{x^2-1}}$

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126. Integrate the following functions  $\frac{5x-2}{1+2x+3x^2}$

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127. Integrate the following functions  $\frac{6x + 7}{\sqrt{(x - 5)(x - 4)}}$

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128. Integrate the following functions  $\frac{x + 2}{\sqrt{4x - x^2}}$

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129. Integrate the following functions  $\frac{x + 2}{\sqrt{x^2 + 2x + 3}}$

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130. Integrate the following functions  $\frac{x + 3}{x^2 - 2x - 5}$

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131. Integrate the following functions  $\frac{5x + 3}{\sqrt{x^2 + 4x + 10}}$

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132. Choose the correct answer  $\int \frac{dx}{x^2 + 2x + 2}$

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

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

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

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

**Answer: B**

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133. Choose the correct answer  $\int \frac{dx}{\sqrt{9x - 4x^2}} =$

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

**Answer: B**



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



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135. Find the following integrals

$$\int \frac{(3 \sin x - 2) \cos x}{5 - \cos^2 x - 4 \sin x} dx$$



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136. Find the following integrals.

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



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137. Integrate the following functions:  $\frac{x}{(x + 1)(x + 2)}$



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138. Integrate the following functions:  $\frac{1}{x^2 - 9}$



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139. Integrate the following functions:  $\frac{3x - 1}{(x - 1)(x - 2)(x - 3)}$



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140. Integrate the following functions:  $\frac{x}{(x-1)(x-2)(x-3)}$

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141. Integrate the following functions:  $\frac{2x}{x^2 + 3x + 2}$

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142. Integrate the following functions:  $\frac{1-x^2}{x(1-2x)}$

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143. Integrate the following functions:  $\frac{x}{(x^2-1)(x-1)}$

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144. Integrate the following functions:  $\frac{x}{(x-1)^2(x+2)}$

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145. Integrate the following functions:  $\frac{3x+5}{x^3-x^2-x+1}$

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146. Integrate the following functions:  $\frac{2x-3}{(x^2-1)(2x+3)}$

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147. Integrate the following functions:  $\frac{5x}{(x+1)(x^2-4)}$

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148. Integrate the following functions:  $\frac{x^3 + x + 1}{x^2 - 1}$

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149. Integrate the following functions:  $\frac{2}{(1-x)(1+x^2)}$

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150. Integrate the following functions:  $\frac{3x - 1}{(x + 2)^2}$

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151. Integrate the following functions:  $\frac{1}{x^4 - 1}$

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152. Integrate the following functions:  $\frac{1}{x(x^n + 1)}$

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153. Integrate the following functions:  $\frac{\cos x}{(1 - \sin x)(2 - \sin x)}$

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154. Integrate the following functions:  $\frac{(x^2 + 1)(x^2 + 2)}{(x^2 + 3)(x^2 + 4)}$

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155. Integrate the following functions:  $\frac{2x}{(x^2 + 1)(x^2 + 3)}$

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156. Integrate the following functions:  $\frac{1}{x(x^4 - 1)}$

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157. Integrate the following functions:  $\frac{1}{e^x - 1}$

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158. Find  $\int \frac{x dx}{(x - 1)(x - 2)}$

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

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

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

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

**Answer: B**



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159. Choose the correct answer  $\int \frac{dx}{x(x^2 + 1)} =$

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

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

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

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

Answer: A



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160. Given that  $\int e^x [f(x) + f'(x)] dx = e^x f(x) + c$ . Using the given result evaluate  $\int e^x (\sin x + \cos x) dx$



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161. Given that  $\int e^x [f(x) + f'(x)] dx = e^x f(x) + c$ . By writing  $\int e^x (\sin x + \cos x) dx = \int e^x \sin x dx + \int e^x \cos x dx$  and applying integration by parts in the first integral, evaluate  $\int e^x (\sin x + \cos x) dx$

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162. Find  $\int \frac{2 + \sin 2x}{1 + \cos 2x} e^x dx$

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163. Find  $\int \frac{2 + \sin 2x}{1 + \cos 2x} e^x dx$

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

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

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166. Integrate the following functions  $x \sin x$

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167. Integrate the following functions  $x \sin 3x$

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168. Integrate the following functions  $x^2 e^x$

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169. Integrate the following functions  $x \log x$

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170. Integrate the following functions  $x \log 2x$

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171. Integrate the following functions  $x^2 \log x$

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172. Integrate the following functions  $x \sin^{-1} x$

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173. Integrate the following functions  $x \tan^{-1} x$

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174. Integrate the following functions  $x \cos^{-1} x$

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175. Integrate the following functions  $(\sin^{-1} x)^2$

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176. Integrate the following functions  $\frac{x \cos^{-1} x}{\sqrt{1-x^2}}$

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177. Integrate the following functions  $x \sec^2 x$

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178. Integrate the following functions  $\tan^{-1} x$

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179. Integrate the following functions  $x(\log x)^2$

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**180.** Integrate the following functions  $(x^2 + 1)\log x$

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**181.** Given that  $\int e^x [f(x) + f'(x)] dx = e^x f(x) + c$ . By writing  $\int e^x (\sin x + \cos x) dx = \int e^x \sin x dx + \int e^x \cos x dx$  and applying integration by parts in the first integral, evaluate  $\int e^x (\sin x + \cos x) dx$

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**182.** Integrate the following functions  $\frac{xe^x}{(1+x)^2}$

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**183.** Integrate the following functions  $e^x \left( \frac{1 + \sin x}{1 + \cos x} \right)$



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184. Integrate the following functions  $e^x \left( \frac{1}{x} - \frac{1}{x^2} \right)$



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185. Integrating the following functions  $\frac{(x - 3)e^x}{(x - 1)^3}$



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186. Integrate the following functions  $e^{2x} \sin x$



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187. Integrate the following functions  $\sin^{-1} \left( \frac{2x}{1 + x^2} \right)$

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188. Choose the correct answer  $\int x^2 e^{x^3} dx =$

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

Answer: A

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189.  $\int e^x \sec x (1 + \tan x) dx = \dots\dots$

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

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

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

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

**Answer: B**

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**190.** Integrate the following functions  $\sqrt{4 - x^2}$

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**191.** Integrate the following functions  $\sqrt{1 - 4x^2}$

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**192.** Integrate the following functions  $\sqrt{x^2 + 4x + 6}$

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193. Integrate the following functions  $\sqrt{x^2 + 4x + 1}$

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194. Integrate the following functions  $\sqrt{1 - 4x - x^2}$

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195. Integrate the following functions  $\sqrt{x^2 + 4x - 5}$

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196. Integrate the following functions  $\sqrt{1 + 3x - x^2}$

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197. Integrate the following functions  $\sqrt{x^2 + 3x}$

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198. Integrate the following functions  $\sqrt{1 + \frac{x^2}{9}}$

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

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

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

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

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



Answer: A



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200. Integrate  $\int \sqrt{x^2 - 8x + 7} dx$

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.

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

Answer: D

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201. Integrate the following function  $x\sqrt{x+x^2}$

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

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

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204. Find  $\int x\sqrt{1+x-x^2}dx$

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

as the limit of a sum

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206. Evaluate  $\int_0^2 e^x dx$  as limit of a sum.

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207. Evaluate the following definite integrals as limits of sums.

$$\int_a^b x dx$$

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208. Find  $\int_0^5 (x + 1)dx$  as limit of a sum.

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209. Evaluate the following definite integrals as limits of sums.

$$\int_2^3 x^2 dx$$

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210. Evaluate the following definite integrals as limits of sums.

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

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211. Evaluate the following definite integrals as limits of sums.

$$\int_{-1}^1 e^x dx$$

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212. Evaluate the following definite integrals as limits of sums.

$$\int_0^4 (x + e^{2x}) dx$$

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213. Evaluate the following integrals:  $\int_2^3 x^2 dx$

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214. Evaluate the following integrals:  $\int_4^9 \frac{\sqrt{x}}{(30 - x^{\frac{3}{2}})^2} dx$



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215. Evaluate the following integrals:  $\int_1^2 \frac{x dx}{(x + 1)(x + 2)}$



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216. Evaluate the following integrals:  $\int_0^{\frac{\pi}{4}} \sin^3 2t \cos 2t dt$



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217. Evaluate the following integrals:  $\int_{-1}^1 (x + 1) dx$



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218. Evaluate the following integrals:  $\int_2^3 \frac{1}{x} dx$

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219. Evaluate the following integrals:  $\int_1^2 (4x^3 - 5x^2 + 6x + 9) dx$

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220. Evaluate the following integrals:  $\int_0^{\frac{\pi}{4}} \sin 2x dx$

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221. Evaluate  $\int_0^{\frac{\pi}{2}} \cos 2x dx$

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222. Evaluate the following integrals:  $\int_4^5 e^x dx$



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223. Evaluate the following integrals:  $\int_0^{\frac{\pi}{4}} \tan x dx$

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224. Evaluate the following integrals:  $\int_{\frac{\pi}{6}}^{\frac{\pi}{4}} \cos ecx dx$

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225. Evaluate the following integrals:  $\int_0^1 \frac{dx}{\sqrt{1-x^2}}$

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226. Evaluate the following integrals:  $\int_0^1 \frac{dx}{1+x^2}$



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227. Evaluate the following integrals:  $\int_2^3 \left( \frac{1}{x^2 - 1} \right) dx$

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228. Evaluate the following integrals:  $\int_0^{\frac{\pi}{2}} \cos^2 x dx$

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229. Evaluate the following integrals:  $\int_2^3 x \frac{dx}{x^2 + 1}$

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230. Evaluate the following integrals:  $\int \frac{2x + 3}{5x^2 + 1}$

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231. Find the following integrals.

$$\int_0^1 x e^{x^2} dx$$

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232. Evaluate the following integrals:  $\int_1^2 \frac{5x^2}{x^2 + 4x + 3} dx$

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233. Evaluate the following integrals:  $\int_0^{\frac{\pi}{4}} (2 \sec^2 x + x^3 + 2) dx$

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234. Evaluate the following integrals:  $\int_0^{\pi} \sin^2\left(\frac{x}{2}\right) - \cos^2\left(\frac{x}{2}\right) dx$

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235. Evaluate the following integrals:  $\int_0^2 \frac{6x + 3}{x^2 + 4} dx$

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236. Evaluate the following integrals:  $\int_0^1 \left( xe^x + \sin\left(\frac{\pi x}{4}\right) \right) dx$

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237. Choose the correct answer.  $\int_0^{\sqrt{3}} \frac{dx}{1 + x^2}$

- A.  $\frac{\pi}{3}$
- B.  $\frac{2\pi}{3}$
- C.  $\frac{\pi}{6}$
- D.  $\frac{\pi}{12}$

**Answer: D**



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**238.** 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.  $P \frac{I}{6}$

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

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

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

**Answer:**



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239. Evaluate the following definite integrals  $\int_0^1 \frac{x}{x^2 + 1} dx$

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240. Evaluate the following definite integrals  $\int_0^{\frac{\pi}{2}} \sqrt{\sin \phi} \cos^5 \phi d\phi$

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241. Evaluate the following definite integrals

$$\int_0^1 \sin^{-1} \left( \frac{2x}{1+x^2} \right) dx$$

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242. Find the following integrals.

$$\int_0^2 x \sqrt{x+2} dx$$



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243. Find the following integrals.

$$\int_0^{\frac{\pi}{2}} \frac{\sin x}{1 + \cos^2 x} dx$$

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244. Evaluate the following definite integrals  $\int_0^2 \frac{dx}{x + 4 - x^2}$

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245. Evaluate the following definite integrals  $\int_{-1}^1 \frac{dx}{x^2 + 2x + 5}$

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246. Evaluate the following definite integrals

$$\int_1^2 \left( \frac{1}{x} - \frac{1}{2x^2} \right) e^{2x} dx$$

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247. Choose the correct answer.  $\int_{\frac{1}{3}}^1 \frac{(x - x^3)^{\frac{1}{3}}}{x^4} dx =$

A. 6

B. 0

C. 3

D. 4

**Answer: A**

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248. If  $f(x) = \int_0^x t \sin t dt$ , then find

$$f'(x)$$

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

B.  $x \sin x$

C.  $x \cos x$

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

**Answer: B**



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249.  $\int_0^{\frac{\pi}{2}} \frac{\sin x}{\sin x + \cos x} dx$



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250. Find the value of

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

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251. Evaluate  $\int_{-1}^1 \log\left(\frac{3-x}{3+x}\right) dx$

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252. Evaluate  $\int_{-1}^2 |x^3 - x| dx$

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253. Evaluate  $\int_{-\frac{\pi}{4}}^{\frac{\pi}{4}} \sin^2 x dx$

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

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255. Using properties evaluate the following definite integrals

$$\int_0^{\frac{\pi}{2}} \cos^2 x dx$$

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256. Find the following integrals.

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

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257. Using properties evaluate the following definite integrals

$$\int_0^{\frac{\pi}{2}} \frac{\sin^{\frac{3}{2}} x}{\sin^{\frac{3}{2}} x + \cos^{\frac{3}{2}} x} dx$$



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258. Using properties evaluate the following definite integrals

$$\int_0^{\frac{\pi}{2}} \frac{\cos^5 x}{\sin^5 x + \cos^5 x} dx$$



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259. Evaluate the following  $\int_{-5}^5 |x + 2| dx$



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**260.** Using properties evaluate the following definite integrals,

evaluate the following:  $\int_2^8 |x - 5| dx$

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**261.** Using properties evaluate the following definite integrals,

evaluate the following:  $\int_0^1 x(1 - x)^n dx$

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**262.** Evaluate.  $\int_0^{\frac{\pi}{4}} \log(1 + \tan x) dx$

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**263.** Find the following integrals.

$$\int_0^2 x \sqrt{2-x} dx$$

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**264.** Using properties evaluate the following definite integrals,

evaluate the following:  $\int_0^{\frac{\pi}{2}} (2 \log \sin x - \log \sin 2x) dx$

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**265.** Using properties evaluate the following definite integrals,

evaluate the following:  $\int_{-\frac{\pi}{2}}^{\frac{\pi}{2}} \sin^2 x dx$

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

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267. Evaluate the following:

$$\int_{-\frac{\pi}{2}}^{\frac{\pi}{2}} \sin^7 x dx$$

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268. Using properties evaluate the following definite integrals,

evaluate the following:  $\int_0^{2\pi} \cos^5 x dx$

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**269.** Using properties evaluate the following definite integrals,

evaluate the following:  $\int_0^{\frac{\pi}{2}} \frac{\sin x - \cos x}{1 + \sin x \cos x} dx$

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**270.** Evaluate  $\int_0^{\pi} \log(1 + \cos x) dx$

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**271.** Using properties evaluate the following definite integrals,

evaluate the following:  $\int_0^a \frac{\sqrt{x}}{\sqrt{x} + \sqrt{a-x}} dx$

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272. Using properties evaluate the following definite integrals,

evaluate the following:  $\int_0^4 |x - 1| dx$



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273. Show that  $\int_0^a f(x)g(x)dx = 2\int_0^a f(x)dx$ , if  $f$  and  $g$  are defined as  $f(x) = f(a - x)$  and  $g(x) + g(a - x) = 4$



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274. Choose the correct answer

$$\int_{-\frac{\pi}{2}}^{\frac{\pi}{2}} (x^3 + x \cos x + \tan^5 x + 1) dx =$$

A. 0

B. 2

C.  $\pi$



D. 1

**Answer: C**

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275. Choose the correct answer  $\int_0^{\frac{\pi}{2}} \log\left(\frac{4 + 3 \sin x}{4 + 3 \cos x}\right) dx$

A. 2

B. 44289

C. 0

D. -2

**Answer: C**

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276. Evaluate  $\int_{-1}^1 \sin^5 x \cos^4 x dx$

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277. Evaluate  $\int_{\frac{\pi}{6}}^{\frac{\pi}{3}} \frac{dx}{1 + \sqrt{\tan x}}$

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278. Find  $\int_0^{\frac{\pi}{2}} \log \sin x dx$

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279. Integrate the following functions w.r.t.x  $\frac{e^{5 \log x} - e^{4 \log x}}{e^{3 \log x} - e^{2 \log x}}$

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280. Integrate the following functions w.r.t.x  $\frac{\cos x}{\sqrt{4 - \sin^2 x}}$

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281. Integrate the following functions  $\frac{x^3}{\sqrt{1 - x^8}}$

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282. integrate the following functions  $\frac{e^x}{(1 + e^x)(2 + e^x)}$

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283. Integrate the following:  $\tan^{-1} \sqrt{\frac{1-x}{1+x}}$

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284. Evaluate the following definite integrals:  $\int_0^{\pi} \frac{x \tan x}{\sec x + \tan x} dx$

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285. Prove the following:  $\int_1^3 \frac{dx}{x^2(x+1)} = \frac{2}{3} + \log\left(\frac{2}{3}\right)$

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286. Prove the following:  $\int_0^1 x e^x dx = 1$

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287. Prove the following  $\int_{-1}^1 x^{17} \cos^4 x dx = 0$

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288. Evaluate  $\int_0^1 e^{2-3x} dx$  as the limit of a sum.

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289. Choose the correct answer.  $\int \frac{dx}{e^x + e^{-x}} =$

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

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

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

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

**Answer: A**

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290. If  $f(a+b-x) = f(x)$ , then  $\int_a^b x f(x) dx =$

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

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

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

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

**Answer: D**



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291. Choose the correct answer  $\int_0^1 \tan^{-1} \left( \frac{2x-1}{1+x-x^2} \right) dx =$

A. 1

B. 0

C. -1

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

**Answer: B**



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