MATHS

BOOKS - NEW JYOTHI MATHS (TAMIL ENGLISH)

INTEGRALS

Examples

1. Write an anti derivative for each of the following functions

(i) $\cos 2x$

(ii) e^{4x}

(iii) $\frac{1}{x}, x \neq 0$

(iv) $3x^2 + 4x^3$

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2. Find the antidervative F of f defined by $f(x) = 4x^3 + 7$, where $F(0) = 5$

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3. Evaluate the following integrals.

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

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4. Evaluate the following integrals.

$$\int (3x^2 + 2e^x) dx$$

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5. Evaluate the following integrals.

$$\int\left(\sqrt{x}+\frac{1}{\sqrt{x}}\right)dx$$

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6. Evaluate the following integrals.

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

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7. Evaluate the following integrals.

$$\int\sec x(\sec x+\tan x)dx$$

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8. Find the following integrals :

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

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9. Find the following integrals :

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

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10. Evaluate $\int e^{\log \sin x} dx$.

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11. Find the following integrals :

$$\int \frac{\text{cosec}^2 x}{\sec^2 x} dx$$

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12. Find the following integrals :

$\int \text{cosec} x(\text{cosec x} + \cot x)dx$

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

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14. If $\frac{d}{dx}[f(x)] = \sin x + \cos x,$

(i) Find $f(x)$

(ii) Write $f(x)$, when $f(x) = 1$

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15. Integrate $\frac{x-1}{x+1}$ w.r.t.x

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

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17. Integrate $\frac{\sin x}{1+\cos^2 x}$ w.r.t.x ,

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

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19. Evaluate $\int \sin^5 x . \cos x dx.$

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20. Integrate the following w.r.t. x.

$(ax + b)^n$

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21. Integrate the following w.r.t. x.

$$\frac{1}{ax + b}$$

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22. Integrate the following w.r.t. x.

$\sec^2(ax + b)$

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23. Integrate e^{2x+5} w.r.t. x.

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24. Integrate $\sec^2(5-4x)$ w.r.t.x.

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25. Evaluate $\int(\sin 2x + 4e^{3x})\,dx$

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26. Evaluate the following Integrals.

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

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27. Integrate $\frac{2\cos x - 3\sin x}{6\cos x + 4\sin x}$ w.r.t.x.

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28. $\frac{1}{1+\tan x}$

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29. Integrate the function $\frac{2}{x + x\log x}$ w.r.t. x.

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

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

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

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33. Evaluate $\int 5^x dx$.

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34. Integrate $\sin(mx)$ w.r.t.x

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35. Integrate $\sin x \sin(\cos x)$ w.r.t. x.

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36. Find $\int 3x^2 e^{x^3} dx$

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37. Evaluate $\int \sin 2x . e^{\cos^2 x} dx$

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38. Integrate $\frac{\cos\left(\tan^{-1} x\right)}{1+x^2}$ w.r.t.x.

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39. Evaluate $\int \frac{4x^3 \sin\left(\tan^{-1}\left(x^4\right)\right)}{1+x^8} dx$

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40. $\int \frac{\tan^4 \sqrt{x} \sec^2 \sqrt{x}}{\sqrt{x}} dx$

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

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42. Evaluate $\int \frac{\sin(2+3\log x)}{x} dx$

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43. Evaluate $\int \frac{\cot(\log x)}{x} dx$

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44. Evaluate $\int 2\log(\sec x + \tan x)\sec x dx.$

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45. Find $\int \frac{\cos x}{\sqrt{1+\sin x}} dx$

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

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47. Evaluate $\int \frac{\sqrt{\tan x}}{\sin x \cos x} dx$

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48. Find $\int \sqrt{\frac{1+\cos x}{1-\cos x}} dx$

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49. Integrate $\sec^4 x$ w.r.t. x.

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

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

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

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53. Integrate $\sin^2(x+5)$ w.r.t x

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54. Find $\int \sin 2x \cos 3x dx.$

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55. Evaluate $\int 2x \cos x^2 dx$

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56. Integrate $\cos^2 x \sin x \cos\left(\cos^3 x\right)$ w.r.t. x.

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

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58. find the integrals following function $\int \frac{dx}{x^2 - 16}.$

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59. Integrate $\frac{\sin x}{1+4\cos^2 x}$ w.r.t x.

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60. Evaluate

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

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61. Integrate $\frac{1}{6-x^2}$ w.r.t. x.

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62. Integrate $\frac{x^2}{1-x^6}$ w.r.t. x.

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63. What is $\int \frac{1}{7+x^2} dx$?

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64. Integrate $\frac{1}{9x^2+16}$ w.r.t. x.

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

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66. Integrate $\frac{1}{\sqrt{4x^2-1}}$ w.r.t x.

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67. Integrate $\frac{x-1}{\sqrt{x^2-1}}$ w.r.t

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68. Integrate $\frac{1}{\sqrt{25-100x^2}}$ w.r.t x.

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69. Find $\int \frac{dx}{\sqrt{6x-x^2}}$.

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

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71. Integrate $\frac{1}{9x^2+49}$ w.r.t x.

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72. Evaluate $\int \frac{\sec^2 x dx}{\sqrt{\tan^2 x+4}}$.

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73. Using the result $\int \frac{dx}{\sqrt{x^2+a^2}} = \log\left|x\sqrt{x^2+a^2}\right| + C$, Evaluate $\int \frac{-\operatorname{cosec}^2 x dx}{\sqrt{\cot^2 x+9}}$

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74. Find $\int \frac{1}{x^2+6x+13} dx$.

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75. Evaluate $\int \frac{1}{x^2+4x+10}dx$

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76. Evaluate $\int \frac{dx}{2x^2+x+3}$.

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

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78. Evaluate $\int \frac{1}{7-4x-2x^2}dx$.

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

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80. Find $\int \frac{x+3}{x^2-2x-5}dx.$

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81. Find $\int \frac{1}{x^2+4x+12}dx.$

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82. Evaluate $\int \frac{1}{x^2-6x+58}dx.$

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

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84. Integrate $\frac{1}{\sqrt{3 - 2x - x^2}}$ w.r.t .x

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

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

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87. Evaluate $\int \frac{e^x}{\sqrt{12 - 4e^x - e^{2x}}} dx$

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

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

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90. Evaluate $\int \frac{dx}{(x + 1)(x + 3)}$

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

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

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93. Evaluate $\int \frac{x-1}{x^2 - 2x - 35} dx.$

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94. Evaluate $\int \frac{2x-5}{x^2 - 5x + 6} dx.$

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95. Integrate: $\int \frac{a^{\log x}}{x} dx$

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96. Integrate the rational function

$\frac{2x}{(x^2+1)(x^2+2)}$ w.r.t x.

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

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

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99. Evaluate $\int \frac{a^{\tan^{-1}x}}{1+x^2}dx.$

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100. Find $\int \frac{3(\sin\phi+2)\cos\phi}{5-\cos^2\phi+4\sin\phi}d\phi.$

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

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

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103. Evaluate $\int \sec^2 x \tan^8 x dx$

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104. Evaluate $\int \frac{1}{x(x^3+1)} dx$

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

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106. Find $\int 2xe^x dx$

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107. Evaluate $\int \frac{3\log x}{x} dx.$

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108. Evaluate $\int \sin^{11} x \cos x dx.$

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109. Integrate $x \sin x$ w.r.t. x.

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

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

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

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113. Integrate $\sin^{-1}\left(\frac{2x}{1+x^2}\right)$ w.r.t. x.

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114. Evaluate $\int x\sin x dx.$

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115. Evaluate: $\int x^2 e^x dx$

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

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117. Integrate $(\log x)^2$ w.r.t. x.

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118. Find $\int \log(x^2 + 2) dx.$

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

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120. Evaluate $\int\frac{\left(\cos^{-1}x\right)^2}{\sqrt{1-x^2}}dx$

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121. Evaluate the Integral:

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

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122. Evaluate $\int e^x\sec x(1+\tan x)dx.$

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123. Consider the integral $I = \int \frac{xe^x}{(1+x)^2} dx$

Express the integral I in the form $\int e^x (f(x) + f'(x)) dx$

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124. Consider the integral $I = \int \frac{xe^x}{(1+x)^2} dx$

What is the value of $\int e^x (f(x) + f'(x)) dx$?

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125. Consider the integral $I = \int \frac{xe^x}{(1+x)^2} dx$

Hence evaluate I.

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

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127. Find $\int \sqrt{x^2+5}dx$

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128. Find $\int \sqrt{x^2-9}dx.$

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129. Find $\int \sqrt{25-x^2}dx$

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130. Find $\int \sqrt{x^2 + 2x + 6} dx$.

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

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132. Integrate $\sqrt{x^2 + 4x + 8}$ w.r.t. x.

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133. Evaluate

$\int \sqrt{(x - 5)(7 - x)} dx$

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134. Evaluate

$$\int \sqrt{14x - 20 - 2x^2}\, dx$$

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135. Evaluate

$$\int \sqrt{4a - x^2}\, dx$$

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136. Evaluate

(i) $\int (x+1)\sqrt{2x^2 + 4}\, dx$

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137. $\int x\sqrt{1 + x - x^2}\, dx$

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138. Evaluate

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

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139. Evaluate

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

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140. Find $\int_0^1 (2x+3)dx$ as the limit of a sum

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141. Evaluate the definite integral $\int_0^1 x^2 dx$ as the limit of a sum .

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142. Find $\int_0^2 (x^2+1)\,dx$ as the limit of a sum

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143. Evaluate $\int_0^3 (2x^2+3)\,dx$ as the limit of a sum

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144. Evaluate $\int_0^2 e^x\,dx$ as the limit of a sum.

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

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146. Evaluate $\int_2^3 \left(x^2+1\right)dx$

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147. Evaluate $\int_0^8 x^{\frac{5}{3}}dx$

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148. If $\int_0^a x^2dx = 8$, find the value of a.

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

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150. Evaluate $\int_{\frac{\pi}{6}}^{\frac{\pi}{2}} \cos x dx.$

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151. Find $\int_0^{\frac{\pi}{4}} \sin^3 2t \cos 2t dt$

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152. Evaluate $\int \sin^3 x dx$

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

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154. Evaluate $\int_0^2 7^x dx$.

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155. Evaluate $\int \frac{x}{(x+1)(x+3)} dx$

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156. Evaluate $\int_0^1 x\sqrt{1+x^2} dx$.

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157. Evaluate $\int_0^1 xe^{x^2} dx$

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158. Evaluate $\int_0^1 \frac{\tan^{-1} x}{1+x^2} dx$

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

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

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161. Evaluate $I = \int_1^{e^2} \frac{dx}{x(1+\log x)^2}$

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

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163. Show that $\int_0^{\frac{\pi}{2}} \cos x dx = \int_0^{\frac{\pi}{2}} \cos y dy.$

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164. Verify $\int_0^{\sqrt{3}} \frac{dx}{1+x^2} = -\int_{\sqrt{3}}^0 \frac{dx}{1+x^2}$

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165. Evaluate $\int_0^3 f(x)dx$, where $f(x) = \begin{cases} x+3 & 0 \leq x \leq 2 \\ 3x & 2 \leq x \leq 3 \end{cases}$

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166. Evaluate $\int_{-3}^{3} |x+1| dx$

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167. Find $\int_{-1}^{2} \left(x^3 - x\right) dx.$

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168. Evaluate $\int_{-1}^{\frac{3}{2}} |x \sin(\pi x)| dx$

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169. Evaluate $\int_{1}^{2} \frac{\sqrt{x} dx}{\sqrt{3-x} + \sqrt{x}}.$

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170. $I = \int_{\frac{\pi}{6}}^{\frac{\pi}{3}} \frac{\sqrt{\cos x}}{\sqrt{\cos x} + \sqrt{\sin x}} dx$.

(i) Use the formula $\int_a^b f(x)dx = \int_a^b f(a+b-x)dx$ in I.

(ii) Add the above result with given value of I.

(iii) Evaluate I

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171. Evaluate $\int_0^{\frac{\pi}{2}} \frac{dx}{1+\sqrt{\tan x}}$

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172. Evaluate $\int_0^1 x(1-x)^n dx$

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173. Evaluate $\int_0^{\frac{\pi}{2}} \frac{\tan^2 x}{\tan^2 x + \cot^2 x} dx$

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174. Show that $\int_0^{\frac{\pi}{2}} \sin^2 x dx = \int_0^{\frac{\pi}{2}} \cos^2 x dx = \frac{\pi}{4}$.

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175. Prove that $\int_0^1 \log\left(\frac{x}{x-1}\right) dx = \int_0^1 \log\left(\frac{x-1}{x}\right) dx$.

Find the value of $\int_0^1 \log\left(\frac{x}{x-1}\right) dx$

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

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177. Evaluate $\int_0^a \frac{\sqrt{x}}{\sqrt{x}+\sqrt{a-x}}dx$

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178. Provethat $\int_0^{\frac{\pi}{2}} \frac{dx}{1+\tan x} = \frac{\pi}{4}$

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179. Prove that $\int_0^{\frac{\pi}{4}} \log(1+\tan x)dx = \frac{\pi}{8}\log 2.$

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180. Prove that $\int_0^{\frac{\pi}{2}} \sin 2x \log \tan x \, dx = 0$

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

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

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183. Evaluate $\int_0^{\pi} \frac{x dx}{a^2 \cos^2 x + b^2 \sin^2 x}$

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184. Show that $\int_0^{\frac{\pi}{2}} \log \sin x dx = \frac{\pi}{2} \log\left(\frac{1}{2}\right) = \frac{-\pi}{2} \log 2$

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185. Evaluate $\int \sin^5 x dx$

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

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187. Evaluate $\int_{\frac{-\pi}{2}}^{\frac{\pi}{2}} \cos x dx.$

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188. Evaluate $\int \sin^5 x \cos^4 x dx$

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189. Prove that $\int_{\frac{-\pi}{3}}^{\frac{\pi}{3}} \log\left[\frac{2-\sin x}{2+\sin x}\right] dx = 0$

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190. Prove that $\int_{-1} x|x|dx = 0$

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191. Show that $\cos^2 x$ is an evan function.

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192. Evaluate $\int_{\frac{-\pi}{4}}^{\frac{\pi}{4}} \cos^2 x dx.$

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Exercise 7 1

1. Find an anti derivative (or integral) of the following functions .

$\sin 2x$

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2. Find an anti derivative (or integral) of the following functions.

$\cos 3x$

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3. Find an anti derivative (or integral) of the following functions .

$2e^{2x}$

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4. Find an anti derivative (or integral) of the following functions .

$(ax + b)^2$

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5. Find an anti derivative (or integral) of the following functions

$\sin 3x - e^{3x}$

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6. Find the following integrals

$\int (4e^{5x} + e^{3x} + 1)\, dx$

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7. Find the following integrals

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

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8. Find the following integrals

$$\int (ax^3 + bx^2 - cx - d)\,dx$$

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9. Find the following integrals

$$\int (2x^2 + e^x)\,dx$$

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10. Find the following integrals

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

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11. Solve the integrals

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

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12. Find the following integrals

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

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13. Find the following integrals

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

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14. Find the following integrals

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

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15. Find the anti - derivative

$$\sqrt{x}\left(3x^2+2x+3\right)dx$$

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16. Find the anti-derivative following as

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

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17. Find the anti-derivative

$$\int (2x^2 - 3\sin x + 5\sqrt{x})\,dx$$

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18. Find the following integrals

$$\int \sec x(\sec x + \tan x)\,dx$$

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19. Find the anti-derivative

$$\int \frac{\sec^2 x}{\text{cosec}^2 x}\,dx.$$

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20. Find the anti-derivative

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

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21. The anti derivative of $\left(2\sqrt{x} + \frac{1}{\sqrt{x}}\right)$ equals

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

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

C. $\frac{4}{3}x^{\frac{2}{3}} + 2x^{\frac{1}{2}} + C$

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

Answer: C

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22. If $\frac{d}{dx}f(x) = 4x^3 - \frac{3}{x^4}$, then $f(x)$ is

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

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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Exercise 7 2

1. Find the anti-derivative following function ; $\frac{1}{x - \sqrt{x}}$

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2. $\int \frac{x}{\sqrt{x+8}} dx, x > 0$

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3. integrate $\left(x^3 - 1\right) x^2$

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

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5. $\int \frac{1 - m}{x(\log x)^m} dx, x > 0$

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6. $\int \frac{1}{16+9x^2} dx$

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7. $\int e^{5x+12} dx$

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

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

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

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

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

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13. $\int \sec^2(7x+4)dx$

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

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15. $\int a^{2x+3} dx$

Watch Video Solution

16. $\int 2x a^{x^2} dx$

Watch Video Solution

17. $\int \frac{\sin \sqrt{x}}{\sqrt{x}} dx$

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18. $\int \sqrt{\sin 3x} \cos 3x dx$

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

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20. $\int \cot x \log \sin x$

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

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

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23. $\frac{1}{1+\cot x}$

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

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25. integrate following as ; $\frac{\sqrt{\tan x}}{\sin x \cos x}$

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26. Integrate fillowing as $\frac{(1+\log x)^2}{x}$

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27. Integrate as $\frac{(x+1)(x+\log x)^2}{x}$

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28. Integrate $\frac{x^3 \sin\left(\tan^{-1} x^4\right)}{1+x^8}$

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29. $\int \frac{10x^9 + 10^x \log_e 10 dx}{x^{10} + 10^x}$ equals

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

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

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

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

Answer: D

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

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

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

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

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

Answer: B

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Exercise 7 3

1. Find the imtegrals of the functions

$\sin^2(3x + 5)$

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2. Find the integrals of the functions

$\sin 3x \cos 4x$

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3. Find the imtegrals of the functions

$\cos 4x \cos 6x$

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4. Find the integrals of the functions

$\sin^3 2x$

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5. Find the imtegrals of the functions

$\sin x \cos^n x$

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6. Find the integrals of the functions

e^{ax+b}

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7. Find the integrals of the functions

$\sin 6x \sin 8x$

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8. Find the integrals of the functions

$$\frac{\sin x}{2+\cos x}$$

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9. Find the integrals of the functions

$\sin^2 2x$

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10. Find the imtegrals of the functions

$\cos^2 2x$

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11. Find the imtegrals of the functions

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

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12. Find the imtegrals of the functions

$$\frac{\cos 2x - \cos 2\alpha}{\cos x - \cos \alpha}$$

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13. Find the imtegrals of the functions

$$\frac{\cos x - \sin x}{1+\sin 2x}$$

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14. Find the integrals of the functions

$\tan^3 2x \sec^2 2x$

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15. Find the imtegrals of the functions

$\tan^4 x$

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16. Find the imtegrals of the functions

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

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17. Find the imtegrals of the functions

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

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18. Find the integrals of the functions

$$\left(\sin x \cos^3 x\right)$$

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19. Find the integrals of the functions

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

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20. Find the imtegrals of the functions

$\sin^{-1}(\cos x)$

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21. Find the integrals of the functions

$$\frac{\cos(x-a)}{\cos x}$$

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22. $\int \frac{\sin^2 x + \cos^2 x}{\sin^2 x \cos^2 x} dx$ is equal to

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

B. $\tan x + \text{cosec}\ \ x + C$

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

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

Answer: A

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

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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Exercise 7 4

1. Integrate the functions

$$\frac{6x^2}{x^6+1}$$

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2. Integrate the functions

$$\frac{4}{\sqrt{1+x^2}}$$

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3. Integrate the functions

$$\frac{1}{\sqrt{(2-x)^2+4}}$$

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4. Integrate the functions

$$\frac{1}{\sqrt{16-25x^2}}$$

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5. Integrate the functions

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

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6. Integrate the functions

$$\frac{x^2}{1-x^6}$$

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7. Integrate the functions

$$\frac{x-2}{\sqrt{x^2-2}}$$

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8. Integrate the functions

$$\frac{3x^2}{\sqrt{x^6+a^6}}$$

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9. Integrate the functions

$$\frac{\sec^2 x}{\sqrt{4-\tan^2 x}}$$

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10. Integrate the functions

$$\frac{\sec^2 x}{\sqrt{\tan^2 x + 9}}$$

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11. Integrate the functions

$$\frac{1}{x^2 + 6x + 10}$$

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12. Integrate the functions

$$\frac{1}{\sqrt{7 + 6x - x^2}}$$

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

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14. Integrate the functions

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

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

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

Watch Video Solution

17. Integrate the functions

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

Watch Video Solution

18. Integrate the functions

$$\frac{6x+2}{1+2x+3x^2}$$

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

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20. Integrate the functions

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

Watch Video Solution

21. Integrate the functions

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

Watch Video Solution

22. Integrate the functions

$$\frac{x+3}{x^2-2x-5}$$

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23. Integrate the functions

$$\frac{1}{\sqrt{x^2+4x+10}}$$

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24. Find the integrals following function ; $\int \frac{dx}{x^2+2x+2}$ equals

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

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

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

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

Answer: B

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25. $\int \frac{dx}{\sqrt{18x-x^2}}$

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Exercise 7 5

1. Anti-derivative of the rational functions

$$\frac{x}{(x+1)(x+2)}$$

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2. find Anti-derivative of the rational functions

$$\frac{1}{x^2-9}$$

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3. Integrate the rational functions

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

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4. Integrate the rational functions

$$\frac{x}{(x-1)(x-2)}$$

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5. Anti-derivative the rational functions

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

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6. Integrate the rational functions

$$\frac{1-x^2}{x}$$

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7. Integrate the rational functions

$$\frac{x}{(x+1)(x-1)}$$

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8. Integrate the rational functions $\frac{x}{(x-1)^2(x+2)}$

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9. Integrate the rational functions

$$\frac{3x+5}{x^3-x^2-x+1}$$

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10. Integrate the following

$$\frac{1}{x^2-36}$$

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11. Integrate the rational functions

$$\frac{5x}{x^2-4}$$

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12. Integrate the rational functions

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

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13. $\frac{2}{(1-x)(1+x^2)}$

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14. Integrate the rational functions

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

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

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16. Integrate the rational functions

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

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17. Integrate the rational functions $\frac{\cos x}{(1-\sin x)(2-\sin x)}$ [Hint: Put

$s \in \quad x \quad = \quad t$]

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18. Integrate the rational functions $\left((x^2+1)\frac{x^2+2}{(x^2+3)(x^2+4)}\right.$

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19. Integrate the rational functions $\frac{2x}{(x^2+1)(x^2+3)}$

Watch Video Solution

20. Integrate the rational functions

$$\frac{1}{x(x^4-1)}$$

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21. Anti-derivative the rational functions

$$\frac{1}{(e^x - 1)}$$

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22. $\int \frac{xdx}{(x-2)(x-3)}$ equals

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

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

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

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

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

Answer: A

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Exercise 7 6

1. Integrate the function

$x \sin 2x$

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2. Integrate the function

$x \sin 3x$

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3. Integrate the function

xe^x

Watch Video Solution

4. Integrate the function

$x \log x$

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5. Integrate the functions$x \log 2x$

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6. Integrate the function

$x^5 \log x$

Watch Video Solution

7. Integrate the function

xe^{-x}

Watch Video Solution

8. Integrate with respect to x.

$x \tan^{-1} x$

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9. Integrate the function

$x \cos^{-1} x$

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10. Integrate the function

$\left(\sin^{-1} x\right)^2$

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11. Integrate the function

$$\frac{a^{\cos^{-1} x}}{\sqrt{1-x^2}}$$

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12. Integrate the function

$x \sec^2 x$

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13. Integrate the functions

$x(\log x)^2$

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14. Integrate the functions

$\left(x^2+1\right)\log x$

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15. Integrate the functions

$e^x(\sin x + \cos x)dx$

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16. Integrate the functions

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

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17. Integrate the functions

$e^t\left(\frac{1}{t} - \frac{1}{t^2}\right)$

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18. Integrate the functions

$$\frac{(x-3)e^x}{(x-1)^3}$$

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19. Integrate the functions

$e^x \sin x$

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20. Integrate the functions

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

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

Answer: A

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22. $\int e^x \sec x(1+\tan x)dx$ equals

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

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

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

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

Answer: B

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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

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

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5. Integrate the functions

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

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6. Integrate the functions

$\sqrt{x^2 + 4x - 6}$

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7. Integrate the functions

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

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

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

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

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

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

Answer: A

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11. $\int\sqrt{x^2-6x+7}\,dx$ is equal to

A.

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

B.

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

C.

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

D.

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

Answer: D

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12. Integrate $x\sqrt{1+x^2}$ w.r.t x.

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13. Integrate $(x+1)\sqrt{x^2+3}$ w.r.t x.

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Exercise 7 8

1. Evaluate the following definite integrals as limit of sums. $\int abxdx$

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2. Evaluate the following definite integrals as limit of sums. $\int 05(x+1)dx$

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3. Evaluate the following definite integrals as limit of sums. $\int 23x^2dx$

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4. Evaluate the following definite integrals as limit of sums. $\int 14(x^2-x)dx$

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5. Evaluate the following definite integrals as limit of sums.

$$\int -11e^x dx$$

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6. Evaluate the following definite integrals as limit of sums.

$$\int_0^4 (x + e^{3x}) dx$$

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Exercise 7 9

1. Evaluate the definite integral

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

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2. Evaluate the definite integral

$$\int_1^2 \frac{1}{x} dx$$

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3. Evaluate the definite integral

$$\int_0^1 \left(4x^3 + 3x^2 - 2x - 1\right) dx$$

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4. Evaluate the definite integral

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

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5. Evaluate the definite integral

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

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6. Evaluate the definite integral

$$\int_1^2 e^x\,dx$$

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7. Evaluate the definite integrals $\int 0\frac{\pi}{4}\tan x\,dx$

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8. Evaluate the definite integral

$$\int_{\frac{\pi}{6}}^{\frac{\pi}{4}} \text{cosec}\quad x\,dx$$

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9. Evaluate the definite integral

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

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10. Evaluate the definite integral

$$\int_2^3 \frac{dx}{1+x^2}$$

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11. Evaluate the definite integral

$$\int_2^4 \frac{dx}{x^2-1}$$

Watch Video Solution

12. Evaluate the definite integral

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

Watch Video Solution

13. Evaluate the definite integral

$$\int_2^3 \frac{dx}{x^2+1}$$

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14. $\int_0^1 \frac{2x+3}{5x^2+1}dx$

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15. Evaluate the definite integral

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

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16. Evaluate the definite integrals $\int 12 \frac{5x^2}{x^2 + 4x + 3}$

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17. Evaluate the definite integral

$$\int_0^{\frac{\pi}{4}} \left(2\sec^2 x + x^3 + 2\right) dx$$

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18. Evaluate the definite integral

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

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19. Evaluate the definite integrals $\int 01 \frac{dx}{1-x^2}$

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20. Evaluate the definite integral

$$\int_0^1 \left(xe^x + \sin\frac{\pi x}{4}\right) dx$$

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21. $\int_{\frac{1}{\sqrt{3}}}^{\sqrt{3}} \frac{dx}{1+x^2}$

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22. $\int \frac{dx}{16+9x^2}$

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Exercise 7 10

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

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

Watch Video Solution

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

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4. The value of the integraal $\int \frac{\left(x - x^2\right)}{x^4} dx$ is

A. 6

B. 0

C. 3

D. 4

Answer: A

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

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

B. $x \sin x$

C. $x . \cos x$

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

Answer: B

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Exercise 7 11

1. By using the properties of definite integrals, evaluate the integrals

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

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2. By using the properties of definite integrals, evaluate the integrals

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

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3. By using the properties of definite integrals, evaluate the integrals

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

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4. By using the properties of definite integrals, evaluate the integrals

$$\int_0^{\frac{\pi}{2}} \frac{\cos^6 x dx}{\sin^6 x + \cos^6 x}$$

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5. $\int_{-5}^{5} |x+2| dx$

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6. evaluate the integrals

$$\int_2^8 |x-5|dx$$

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7. evaluate the integrals

$$\int_0^1 x(1-x)dx$$

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8. By using the properties of definite integrals, evaluate the integrals

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

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9. evaluate the integrals

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

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10. By using the properties of definite integrals, evaluate the integrals

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

Watch Video Solution

11. By using the properties of definite integrals, evaluate the integrals

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

Watch Video Solution

12. By using the properties of definite integrals, evaluate the integrals

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

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13. By using the properties of definite integrals, evaluate the integrals

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

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14. By using the properties of definite integrals, evaluate the integrals

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

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15. By using the properties of definite integrals, evaluate the integrals

$$\int_0^{\pi} \log(1+\cos x)dx$$

Watch Video Solution

16. By using the properties of definite integrals, evaluate the integrals

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

Watch Video Solution

17. evaluate the integrals

$$\int_0^4 |x-1|dx$$

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18. By using the properties of definite integrals, evaluate the integrals

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

A. 0

B. 2

C. π

D. 1

Answer: C

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

A. 2

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

C. 0

D. -2

Answer: C

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Additional Questions For Practice 7 1

1. Find the anti derivative (or integrals) of the following by method of inspection.

$\sin 3x$

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2. Find the anti derivative (or integrals) of the following

e^{-2x}

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3. Find the anti derivative (or integrals) of the following by method of inspection.

$(ax+b)^3$

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4. Match the following.

A	B
i $\int x^5 dx$	$\frac{-1}{x+1}+C$
ii. $\int \sin 2x\, dx$	$\tan x + C$
iii. $\int (1+\tan^2 x) dx$	$\frac{-\cos 2x}{2}+C$
iv. $\int \frac{1}{(x+1)^2} dx$	$x^5 + C$
	$\frac{x^6}{6}+C$

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5. If $\frac{d}{dx}[f(x)] = x^2 - 2x + 5,$

i. Find $f(x).,$

ii. Write $f(x)$, when $f(3) = 16$

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6. Suppose $f(x) = \frac{d}{dx}(e^x + 2)$. Find $\int f(x)dx$

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7. Suppose $f(x) = \frac{d}{dx}(e^x + 2)$. Find $\int (f(x) + x^2)dx$

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8. Suppose $f(x) = \frac{d}{dx}(e^x + 2)$. Find $\int (f(x) - \sin x)dx$.

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9. Find the following integrals

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

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10. Find the following integrals

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

Watch Video Solution

11. Find the following integrals

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

Watch Video Solution

12. Find the following integrals

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

Watch Video Solution

13. Find the following integrals

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

Watch Video Solution

14. Find the following integrals

$$\int\frac{\operatorname{cosec} x}{\operatorname{cosec}\ x-\sin x}dx$$

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15. Find the following integrals

$$\int \frac{\text{cosec x. cot } x}{2} dx$$

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Additional Questions For Practice 7 2

1. Integrate the following w.r.t. x.

$(4x + 3)^8$

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2. Integrate the following w.r.t. x.

e^{9-8x}

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3. Integrate the following w.r.t. x.

$\sqrt{4x-3}$

Watch Video Solution

4. Integrate the following w.r.t. x.

$$\frac{1}{9x-10}$$

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5. Integrate the following w.r.t. x.

$\text{cosec}\ (5x+1)\cot(5x+1)$

Watch Video Solution

6. Integrate the following w.r.t. x.

$\sec^2(10 - 3x)$

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7. Integrate the following w.r.t. x.

$2xe^{x^2}$

Watch Video Solution

8. Integrate the following w.r.t. x.

$$\frac{\sin(\log x)}{x}$$

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9. Integrate the following w.r.t. x.

$x^2 \sin x^3$

Watch Video Solution

10. Integrate the following w.r.t. x.

$$\frac{e^{\cos^{-1} x}}{\sqrt{1-x^2}}$$

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11. Integrate the following w.r.t. x.

$$\frac{\sin\sqrt{x}}{2\sqrt{x}} dx.$$

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12. Integrate the following w.r.t. x.

$\sec^2\left(x^{13}\right)x^{12}dx$

Watch Video Solution

13. Integrate the following w.r.t. x.

$\text{cosec}\ \left(x^8\right)\cot\left(x^8\right)x^7$

Watch Video Solution

14. Integrate the following w.r.t. x.

$x^3\sqrt{x^4-3}$

Watch Video Solution

15. Integrate the following w.r.t. x.

$e^{\sin^2 x} \sin 2x$

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16. Integrate the following w.r.t. x.

$$\frac{\cos^{-1} x}{\sqrt{1-x^2}}$$

Watch Video Solution

17. Integrate the following w.r.t. x.

$$\frac{\left(\cos^{-1} x\right)^2}{\sqrt{1-x^2}}$$

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18. Integrate the following w.r.t. x.

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

Watch Video Solution

19. Integrate the following w.r.t. x.

$$\frac{x}{1+x^4}$$

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20. Integrate the following w.r.t. x.

Find $\int \frac{\sqrt{\cot x} dx}{\sin x \cos x}$

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Additional Questions For Practice 7 2 Fill In The Blanks

1. $\int \frac{\tan x}{\log \sec x} dx = \ldots\ldots\ldots$

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2. Integrate the function ; $\int \sec^4 x \tan x dx = \ldots\ldots\ldots$

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3. $\int \frac{(\log x)^3}{x} dx = \ldots\ldots\ldots$

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4. $\int \frac{6x^5 dx}{1 + x^6} = \ldots\ldots\ldots$

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Additional Questions For Practice 7 3

1. Find $\int \cos^3(1-4x)dx$

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2. Integrate $\sin 5x \cos 5x$ w.r.t. x.

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

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4. Evaluate $\int \cos^2(4x+1)dx$

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5. Find $\int \frac{\cos 2x}{(\sin x + \cos x)^5} dx$

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6. Integrate $\cos^5 x$ w.r.t. x

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7. Evaluate $\int \tan 3x \tan 2x \tan x dx$

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Additional Questions For Practice 7 4

1. Integrate the following w.r.t. x .

$$\frac{1}{9-x^2}$$

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2. Integrate the following w.r.t. x .

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

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3. Integrate the following w.r.t. x .

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

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4. Integrate the following w.r.t. x .

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

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5. Integrate the following w.r.t. x .

$$\frac{1}{\sqrt{18-2x^2}}$$

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6. Integrate the following w.r.t. x .

$$\frac{\sec^2 x}{\tan^2 x - 1}$$

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7. Integrate the following w.r.t. x .

$$\frac{\sec^2 x}{\sqrt{\tan^2 x + 4}}$$

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8. Integrate the following w.r.t. x .

$$\frac{\operatorname{cosec}^2 x}{\sqrt{25 + \cot^2 x}}$$

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9. Integrate the following w.r.t. x .

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

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

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

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

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

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14. Find $\int \frac{dx}{\sqrt{5 - 4x - x^2}}$

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

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16. Find $\int \frac{e^x}{\sqrt{4-e^{2x}}} dx$

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17. Integrate the function

$$\frac{x+2}{\sqrt{x^2+2x+3}}$$

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18. $\frac{2x+3}{\sqrt{x^2+4x+1}}$

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

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20. Evaluate $\int \frac{2x+3}{\sqrt{x^2+4x+9}}dx$

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Additional Questions For Practice 7 5

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

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2. $\int \frac{1}{(x-2)} dx = \ldots\ldots\ldots + C$

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

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

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

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6. Intehrate $\frac{x^2+x+1}{x^2(x+2)}$ w.r.t. x

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7. Integrate $\frac{5}{(x^2+1)(x^2+2)}$ w.r.t. x

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

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

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

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

Watch Video Solution

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

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Additional Questions For Practice 7 6

1. Integrate the following functions w.r.t x.

$x^2 \log 3x$

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2. Integrate the following functions w.r.t x.

$x^2 e^{3x}$

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3. Integrate the following functions w.r.t x.

$x^2 \sin x$

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4. Integrate the following functions w.r.t x.

$$\frac{\left(\sin^{-1} x\right)^5}{\sqrt{1-x^2}}$$

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5. Integrate the following functions w.r.t x.

$x^2 \tan^{-1} x$

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6. Integrate the following functions w.r.t x.

$e^{3x} \cos 4x$

Watch Video Solution

7. Integrate the following functions w.r.t x.

$e^{2x} \sin 3x$

Watch Video Solution

8. Integrate the following functions w.r.t x.

$e^x(\tan x + \log \sec x)$

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9. Integrate the following functions w.r.t x.

$e^x\left(\cot x - \text{cosec}^2 x\right)$

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10. Integrate the following with respect to x.

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

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Additional Questions For Practice 7 7

1. Integrate the following functions

$\sqrt{1+2x-3x^2}$

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2. Integrate the following functions

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

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3. Evaluate

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

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4. Evaluate

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

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5. Evaluate

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

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6. find the anti-derivatives of the following function;

$$\int \sqrt{(x-3)(5-x)} dx$$

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7. Find the anti-derivatives of the following function:

$$\int \sqrt{(2ax - x^2)}\, dx$$

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

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9. Evaluate

$$\int \sqrt{6 + 4x - x^2}\, dx$$

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Additional Questions For Practice 7 8

1. Evaluate the following definite integrals as limit of a sum.

$$\int_1^3 x dx$$

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2. Evaluate the following definite integrals

$$\int_0^5 (x-1) dx$$

Watch Video Solution

3. Evaluate the following definite integrals

$$\int_0^4 (x+2) dx$$

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4. Evaluate the following definite integrals

$$\int_1^3 x\,dx$$

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5. Evaluate the following definite integrals

$$\int_1^2 \left(x^2+2\right)dx$$

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6. Evaluate the following definite integrals

$$\int_0^1 e^x\,dx$$

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Additional Questions For Practice 7 9

1. Evaluate the following definite integrals.

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

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2. Evaluate the following definite integrals.

$$\int_{0}^{4} x^{\frac{1}{2}} dx$$

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3. Evaluate the following definite integrals.

$$\int_{0}^{9} \left(x + x^{\frac{3}{2}}\right) dx$$

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4. If $\int_{0}^{\frac{\pi}{2}} \sin 2x dx = \frac{4a}{\pi}$, find the value of a.

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5. evaluate $\int_0^a \sin x dx.$

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6. If $\int_2^a \frac{dx}{x^2-1} = \frac{1}{2}\log\frac{3}{2}, a > 1.$

find the value of 'a'

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7. If $\int_2^a \frac{dx}{x^2-1} = \frac{1}{2}\log\frac{3}{2}, a > 1.$

Using the value of a, evaluate

$\int_2^a \frac{x}{x^2+1} dx.$

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8. Find $\int_0^1 \left(xe^x + \cos\frac{\pi x}{4}\right)dx.$

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

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10. Evaluate $\int_0^{\frac{\pi}{4}} \sin^2 2x dx$

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11. Find $\int_1^5 x^2 dx$

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12. Find $\int_4^9 \frac{\sqrt{x}}{\left(30 - x^{\frac{3}{2}}\right)^2} dx$

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Additional Questions For Practice 7 10

1. Evaluate $\int_{-1}^{1} x^3 \left(x^4 + 1\right)^3 dx$

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2. Evaluate $\int_0^2 \frac{5x}{(4 + x^2)} dx$

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3. Evaluate $\int_2^3 \frac{x dx}{x^2 + 1}$

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

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

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6. From the first fundamental principle of integral calculs, we get $f'(x)x\sin x$

Using proper substitution, evaluate

$\int_0^{\frac{\pi}{6}} (1-\cos 3\theta)\sin 3\theta d\theta$

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7. From the first fundamental principle of integral calculs, we get $f'(x)x\sin x$

Evaluate $\int_1^{\frac{\pi}{2}} \sqrt{\cos x}.\sin^3 x dx$

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

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9. Evaluate $\int_1^e \frac{1+\log x}{x} dx$

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Additional Questions For Practice 7 11

1. $\int_2^8 f(x)dx$ where $f(x) = \begin{cases} 3x+4, & 2 \le x \le 3 \\ x^2+4, & 3 \le x \le 8 \end{cases}$.

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2. $\int_1^4 f(x)dx$ where $f(x) = \begin{cases} 4x+3, & 1 \le x \le 2 \\ 3x+5, & 2 \le x \le 4 \end{cases}$

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

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4. Evaluate $\int_{-4}^4 |x+2|dx$

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5. Evaluate $\int_1^4 f(x)dx$, where

$$f(x) = \begin{cases} 2x+8, & 1 \le x \le 2 \\ 6x, & 2 \le x \le 4 \end{cases}.$$

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6. Evaluate $\int_{\frac{\pi}{6}}^{\frac{\pi}{3}} \frac{\sqrt{\sin x}}{\sqrt{\sin x}+\sqrt{\cos x}}dx$

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7. $\int_0^{\frac{\pi}{2}} \frac{\sec^3 x dx}{\sec^3 x + \operatorname{cosec}^3 x}$

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8. $\int_0^{\frac{\pi}{2}} \frac{\cot^2 x dx}{\tan^2 x + \cot^2 x}$

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9. Show that $\int_0^{\frac{\pi}{2}} \frac{\tan^4 x}{1+\tan^4 x} dx = \frac{\pi}{4}$

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

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11. Show that $\int_0^1 \log\left(\frac{1-x}{x}\right) dx = 0$

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12. $\int_0^{\pi} \sin^{2m} x \cos^{2m+1} x dx = 0$

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

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14. Evaluate $\int_0^1 x(1-x)^6 dx$

Watch Video Solution

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

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16. Find $\int_{\frac{-\pi}{4}}^{\frac{\pi}{4}} |\sin x| dx$

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17. Prove that $\int_0^{\pi} \frac{x \sin^3 x}{1+\cos^2 x} dx = \frac{\pi}{2}(\pi - 2)$

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Ncert Miscellaneous Exercies

1. find the anti-derivative of the functions

$$\frac{1}{x - x^3}$$

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2. find the anti-derivative of the functions

$$\frac{1}{\sqrt{x+a} + \sqrt{x+b}}$$

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3. Integrate the functions

$$\frac{1}{x\sqrt{\log x - 2}}$$

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4. Integrate the functions

$$\frac{1}{x^2(x^4+1)^{\frac{3}{4}}}$$

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5. Integrate the functions

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

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6. Integrate the functions

$$\frac{a^{\log x}}{x}$$

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7. Integrate the functions

$$\frac{\sin x}{\sin(x+a)}$$

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8. Integrate the functions

$$\frac{e^{5\log x}+e^{4\log x}}{e^{3\log x}+e^{2\log x}}$$

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9. Integrate the functions

$$\frac{\cos x}{\sqrt{16 - \sin^2 x}}$$

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10. Integrate the functions

$$\frac{\sin^8 x - \cos^8 x}{1 - 2\sin^2 x \cos^2 x}$$

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11. Integrate the functions

$$\frac{1}{\cos(x + a)\cos(x + b)}$$

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12. Integrate the functions

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

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13. Integrate the functions

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

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

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15. Integrate the functions

$$\cos^4 x e^{\log \sin x}$$

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16. Integrate the functions

$4e^{3\log x}\left(x^4+1\right)^{-1}$

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17. Integrate the functions

$af'(ax+b)[f(ax+b)]^n$

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

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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. Integrate the functions $\tan^{-1}\sqrt{\frac{1-x}{1+x}}$

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24. Integrate the functions $\frac{\sqrt{x^2+1}\left[\log\left(x^2+1\right)-2\log x\right]}{x^4}$

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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. Evaluate the definite integrals $\int_0^{\frac{\pi}{4}} \frac{\sin x\cos x}{\cos^4 x+\sin^2 x}dx$

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27. Evaluate the definite integrals

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

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28. Evaluate the definite integrals

$$\int_{\frac{\pi}{6}}^{\frac{\pi}{3}} \frac{\sin x + \cos x}{\sqrt{\sin 2x}} dx.$$

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29. Evaluate the integrals

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

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30. Evaluate the definite integrals

$$\int_0^{\frac{\pi}{4}} \frac{\sin x + \cos x}{9 + 16 \sin 2x} dx$$

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31. Evaluate the definite integrals

$$\int_0^{\frac{\pi}{2}} \sin 2x \tan^{-1}(\sin x) dx$$

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32. Evaluate the definite integrals

$$\int_0^{\pi} \frac{x \tan x}{\sec x + \tan x} dx$$

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33. integrate wrt x

$$\frac{\pi}{2}(\pi - 2)$$

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34. Prove the following

$$\int_1^3 \frac{dx}{x^2(x+1)} = \frac{2}{3} + \log\frac{2}{3}$$

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35. $\int_0^1 xe^x dx = 1$

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36. Prove the following

$$\int_{-1}^{1} x^{17}\cos^4 x dx = 0$$

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37. Prove the following

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

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38. Prove the following

$$\int_0^{\frac{\pi}{4}} 2\tan^3 x dx = 1 - \log 2$$

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39. Prove the following

$$\int_0^1 \sin^{-1} x dx = \frac{\pi}{2} - 1$$

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40. Evaluate $\int_0^1 e^{2-3x}dx$

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41. $\int \frac{dx}{e^x + e^{-x}}$ is equal to

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

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

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

D. $\log(e^x + x^x) + C$

Answer: A

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

A. $\frac{-1}{\sin x + \cos x} + C$

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

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

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

Answer: B

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

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

Answer: B

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Unit Test

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

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2. Integrate $\frac{1}{x(x+2)}$ w.r.t x

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3. Integrate the following function ; $\int e^x \left(\sin^{-1} x + \frac{1}{\sqrt{1-x^2}} \right) dx$

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4. Integrate $x^4 \log x$ w.r.t. x.

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

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6. Show that $\int_0^1 \frac{e^x}{1+e^{2x}}dx = \tan^{-1}(e) - \frac{\pi}{4}$

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7. Evaluate $\int_1^2 (2x+3)dx$ as the limit of a sum.

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8. Using the property of integral, find $\int_3^9 \frac{\sqrt{12-x}}{\sqrt{x}+\sqrt{12-x}}dx$

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Continuous Evaluation Assignment

1. Integrate $\sqrt{a^2 - x^2}$ w.r.t. x in two ways

a. by the substitution $x = a \sin \theta$

b. integrate by parts

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2. Let $f(x)$ and $g(x)$ are two differentiable functions. If $f(x) = g(x)$,

then show that $f'(x) = g'(x)$.

Is the converse true ? Justify your answer

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3. Evaluate $\int_0^{\pi/2} \frac{\cos \theta}{(1 + \sin \theta)(2 + \sin \theta)} d\theta$

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4. Evaluate $\int_0^2 (2x+1)dx$ as limit of a sum

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Continuous Evaluation Project

1. Integration is the reverse process of differentiation

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Objective Type Questions

1. $\int e^{a\log x}dx$ is equal to

A. $\int \frac{e^{a\log x}}{a} + C$

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

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

D. $a.\ x^a + C$

Answer: B

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2. $\int \sec^2(7+4x)dx$ equal to

A. $\frac{1}{4}\tan(7+4x) + C$

B. $\frac{-1}{4}\tan(7+4x) + C$

C. $\frac{1}{4}\tan(7-4x) + C$

D. $\frac{-1}{4}\tan(7-4x) + C$

Answer: A

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

A. $-e^{x^2} + C$

B. $e^{x^2} + C$

C. $e^{x} + C$

D. $-e^{x} + C$

Answer: B

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4. $\int \cos^3 x.\, e^{\log \sin x} dx$ is equal to

A. $\frac{\cos^4 x}{4} + C$

B. $\frac{-\cos^4 x}{4} + C$

C. $\frac{\cos^4 x}{4x} + C$

D. $\frac{-\cos^4 x}{4x} + C$

Answer: B

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5. $\int \left(e^{a \log x} + e^{x \log a}\right) dx$ is equal to

A. $\frac{x^{a+1}}{a+1}$

B. $\frac{x^{a+1}}{a+1} + \frac{a^x}{\log a}$

C. $x^{a+1} + a^x$

D. $\frac{x^{a-1}}{a-1} + \frac{\log a}{a^x}$

Answer: B

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

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

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

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

D. $3\sin 2x - 4\cos 4x + C$

Answer: C

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7. $\int 13^x dx$

A. $\frac{13^x}{\log 13} + C$

B. $13^{x+1} + C$

C. $14x + C$

D. $14^{x+1} + C$

Answer: A

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8. $\int e^{-\log x} dx = ?$

A. $e^{-\log x}$

B. $-xe^{-\log x}$

C. $\log|x|$

D. $-\log x$

Answer: C

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9. $\int \frac{1}{x^2+4x+13} dx$ is equal to

A. $\log\left(x^2+4x+13\right)+C$

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

C. $\log(2x+4)+C$

D. $\frac{1}{x^2+4x+13}+C$

Answer: B

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10. $\int \frac{f'(x)}{f(x)\log\{f(x)\}}dx =$

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

B. $f(x)\log f(x)$

C. $\log[\log f(x)]$

D. $\frac{1}{\log[\log f(x)]}$

Answer: C

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11. The value of $\int \frac{e^{5\log_e x} + e^{4\log_e x}}{e^{3\log_e x} + e^{2\log_e x}} dx$ is

A. $x^2 + C$

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

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

D. $\frac{x}{2} + C$

Answer: C

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12. $\int \frac{1}{x(\log x)\log(\log x)} dx =$

A. $\log(\log x) + C$

B. $\log|\log(x \log x)| + C$

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

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

Answer: D

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13. $\int(\cos^{-1}x+\sin^{-1}x)dx$ is equal to

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

B. $\pi x+C$

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

D. None of these

Answer: A

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

A. $\frac{x}{2}\sqrt{x^2+a^2}-\frac{a^2}{2}\log\left|x+\sqrt{x^2+a^2}\right|+C$

B. $\frac{x}{2}\sqrt{x^2+a^2}+\frac{a^2}{2}\log\left|x+\sqrt{x^2+a^2}\right|+C$

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

D. $\frac{x}{2}\sqrt{x^2+a^2}+\frac{a^2}{2}\log\left|x-\sqrt{x^2+a^2}\right|+C$

Answer: B

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15. $\int x dx$ is equal to

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

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

C. $x|x|+C$

D. $\frac{1}{2}x|x| + C$

Answer: D

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

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

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

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

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

Answer: B

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17. If $\int \sin x \frac{d}{dx}(\sec x)dx = f(x) - g(x) + C$, then

A. $f(x) = \sec x$

B. $f(x) = \tan x$

C. $g(x) = 2x$

D. $g(x) = x^2$

Answer: B

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18. $\int 2e^x \{\log \sin x + \cot x\}dx =$

A. $2e^x \cot x + C$

B. $2e^x \log \sin x + C$

C. $2e^x \log \sin x + \tan x + C$

D. $2e^x \sin x + C$

Answer: B

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19. $\int e^x (\sin x + 2\cos x) \sin x dx$ is equal to

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

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

C. $e^x \sin^2 x + C$

D. $e^x \sin 2x + C$

Answer: C

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20. $\int \frac{e^x}{x}(1 + x \log x)dx$ is equal to

A. $e^x \log x + C$

B. $\frac{e^x}{x} + C$

C. $\frac{e^x \log x}{x} + C$

D. $e^x + C$

Answer: A

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21. $\int_1^2 x^2 dx$ is equal to

A. 1

B. $\frac{7}{3}$

C. $\frac{1}{3}$

D. 0

Answer: B

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22. $\int_{\frac{-1}{2}}^{\frac{1}{2}} \frac{dx}{(1-x^2)^{\frac{1}{2}}} =$

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

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

C. $\frac{\pi}{3}$

D. 0

Answer: C

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23. $\int_0^{\pi} \frac{\cos x}{1+\sin x} dx =$

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24. $\int_1^2 \frac{dx}{x^2}$ is equal to

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

B. 1

C. 2

D. -1

Answer: A

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25. The value of $\int_0^4 \left[\tan^{-1}\left(\frac{x}{x^2+1}\right) + \tan^{-1}\left(\frac{x^2+1}{x}\right)\right] dx$ is

A. 2π

B. π

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

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

Answer: A

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

A. $\log|2x^3+1| + c$

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

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

D. $\frac{1}{6}\log|2x^3+1| + c$

Answer: D

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27. $\int_3^6 \frac{\sqrt{x}}{\sqrt{9-x}+\sqrt{x}}$ dx is

A. 0

B. $\frac{1}{3}$

C. $\frac{1}{2}$

D. $\frac{3}{2}$

Answer: D

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28. The value of $\int_1^2 [x]dx$, where $[x]$ is the greatest integer less than or equal to x is

A. 0

B. 1

C. 2

D. 4

Answer: B

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29. The value of $\int_0^{\frac{\pi}{2}} \frac{2^{\sin x}}{2^{\sin x}+2^{\cos x}}dx =$

A. 2

B. π

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

D. 2π

Answer: C

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30. If $\int_{-\frac{1}{2}}^{\frac{1}{2}} \cos x . \log\left(\frac{1+x}{1-x}\right) dx = k . \log 2$, then k =

A. 0

B. -1

C. -2

D. $\frac{1}{2}$

Answer: A

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31. $\int (3^x + 4^x) dx$

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32. $\int_0^1 x(1-x)^{99}dx =$

A. $1/10100$

B. $11/10100$

C. $1/10010$

D. $11/11100$

Answer: A

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33. The value of $\int_0^{\frac{\pi}{4}} \sqrt{1-\sin 2x}dx$ is

A. $\sqrt{2}-1$

B. $\sqrt{2}+1$

C. $\sqrt{2}$

D. 0

Answer: A

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34. Match the columns.

Column I	Column II
i. $\int_{-1}^{1} \frac{dx}{1+x^2} dx$	a. $\frac{1}{2}\log\left(\frac{2}{3}\right)$
ii. $\int_{0}^{\frac{1}{2}} \frac{dx}{\sqrt{1-x^2}}$	b. $2\log\left(\frac{2}{3}\right)$
iii. $\int_{\frac{1}{2}}^{1} \frac{dx}{1-x^2}$	c. $\frac{\pi}{3}$
iv. $\int_{1}^{2} \frac{dx}{x\sqrt{x^2-1}}$	d. $\frac{\pi}{2}$
	e. $\frac{\pi}{6}$

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