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REDUCED Integral Calculus – I

12th Standard

Business Maths

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42 x 1 = 42

1) $\int \frac{1}{x^3} dx$ is

(a) $\frac{-3}{x^2} + c$ (b) $\frac{-1}{2x^2} + c$ (c) $\frac{-1}{3x^2} + c$ (d) $\frac{-2}{x^2} + c$

2) $\int 2^x dx$ is

(a) $2^x \log 2 + c$ (b) $2^x + c$ (c) $\frac{2^x}{log2} + c$ (d) $\frac{log2}{2^x} + c$

3) $\int \frac{sin2x}{2sinx} dx$ is

(a) sin x + c (b) $\frac{1}{2}$ sin x + c (c) cos x + c (d) $\frac{1}{2}$ cos x + c

4) $\int \frac{\sin 5x - \sin x}{\cos 3x} dx$ is

(a) −cos 2x + c (b) −cos 2x + c (c) $-\frac{1}{4}$ cos2x + c (d) −4cos2x + c

5) $\int \sqrt{e^x}$ dx is

(a) $\sqrt{e^x} + c$ (b) $2\sqrt{e^x}$ + c (c) $\frac{1}{2}\sqrt{e^x} + c$ (d) $\frac{1}{2\sqrt{e^x}} + c$

6) $\int \left[\frac{9}{x-3} - \frac{1}{x+1}\right] dx$ is

(a) $log|x-3| - log|x+1| + c$ (b) $log|x-3| + log|x+1| + c$ (c) $9log|x-3| - log|x+1| + c$ (d) $9log|x-3| + log|x+1| + c$

7) $\int_0^1 (2x+1) dx$ is

(a) 1 (b) 2 (c) 3 (d) 4

8) $\int_2^4 \frac{dx}{x}$ is

(a) log 4 (b) 0 (c) log 2 (d) log 8

9) $\int_0^\infty e^{-2x}$ is

(a) 0 (b) 1 (c) 2 (d) $\frac{1}{2}$

10) $\int_{-1}^1 x^3 e^{x^4}$ dx is

(a) 1 (b) $2\int_{-1}^1 x^3 e^{x^4} dx$ (c) 0 (d) e^{x^4}

11) If f (x) is a continuous function and a < c < b ,then $\int_a^c f(x)dx + \int_c^b f(x)dx$ is

(a) $\int_a^b f(x)dx - \int_a^c f(x)dx$ (b) $\int_a^c f(x)dx - \int_a^b f(x)dx$ (c) $\int_a^b f(x)dx$ (d) 0

12) The value of $\int_{-\frac{\pi}{2}}^{\frac{\pi}{2}} \cos x \, dx$ is

(a) 0 (b) 2 (c) 1 (d) 4

13) $\int_0^1 \sqrt{x^4(1-x)^2} dx$ is

(a) $\frac{1}{12}$ (b) $\frac{-7}{12}$ (c) $\frac{7}{12}$ (d) $\frac{-1}{12}$

14) If $\int_0^1 f(x)dx = 1, \int_0^1 xf(x)dx = a$ and $\int_0^1 x^2 f(x)dx = a^2$, then $\int_0^1 (a-x)^2 f(x)$ is

(a) $4a^2$ (b) 0 (c) $2a^2$ (d) 1

15) The value of $\int_2^3 f(5-x)dx - \int_2^3 f(x)dx$ is

(a) 1 (b) 0 (c) -1 (d) 5

16) $\int_0^4 \left(\sqrt{x} + \frac{1}{\sqrt{x}}\right)$dx is

(a) $\frac{20}{3}$ (b) $\frac{21}{3}$ (c) $\frac{28}{3}$ (d) $\frac{1}{3}$

17) $\int_{\theta}^{\frac{\pi}{}} tanxdx$ is

(a) log 2 (b) 0 (c) $\log\sqrt{2}$ (d) 2 log 2

18) $\int (x-1)e^{-x}$ dx = _____ +c

(a) $-xe^x$ (b) xe^x (c) $-xe^{-x}$ (d) xe^{-x}

19) If $\int \frac{2^{\frac{1}{x}}}{x^2}dx = k2^{\frac{1}{x}}$ +c, then k is

(a) $-\frac{1}{log_e 2}$ (b) $-\log_e 2$ (c) -1 (d) $\frac{1}{2}$

20) $\int |x|^3$dx = _____ +c

(a) $\frac{-x^4}{4}$ (b) $\frac{|x|^4}{4}$ (c) $\frac{x^4}{4}$ (d) none of these

21) If $\int$ x sin x dx = - x cos x + α then α = _____ +c

(a) sin x (b) cos x (c) C (d) none of these

22) If $\int \frac{1}{(x+2)\left(x^2+1\right)}$ dx = a log $\left|1+x^2\right|$ +b $\tan^{-1}$ x + $\frac{1}{5}log|x+2|$ +c then

(a) $a = -\frac{1}{10}, b = \frac{-2}{5}$ (b) $a = \frac{1}{10}, b = \frac{-2}{5}$ (c) $a = -\frac{1}{10}, b = \frac{2}{5}$ (d) $a = \frac{1}{10}, b = \frac{2}{5}$

23) $\int 3^{x+2}$ dx = _____ +c

(a) $\frac{3^x}{log3}$ (b) $\frac{9\left(3^x\right)}{log3}$ (c) $\frac{3.3^x}{log3}$ (d) $\frac{3^x}{9log3}$

24) $\int \left(\frac{x}{m} + \frac{m}{x}\right)$ dx = _____ +c

(a) $\frac{x^2}{2m} + m\log|x|$ (b) $\frac{x}{m^2} + m\log|x|$ (c) $-\frac{1}{mx^2} + m\log|x|$ (d) $\frac{1}{m} - \frac{m}{x^2}$

25) The anti-derivative of f(x) = $\sqrt{x} + \frac{1}{\sqrt{x}}$ is _____ +c

(a) $\frac{2}{3}x^{\frac{3}{2}} + \frac{2}{x^{\frac{1}{2}}}$ (b) $\frac{3}{2}x^{\frac{3}{2}} + 2x^{\frac{1}{2}}$ (c) $\frac{2}{3}x^{\frac{3}{2}} + 2x^{\frac{1}{2}}$ (d) none

26) $\int a^{3x+2}$ dx = _____ +c

(a) a^{3x+2} (b) $\frac{a^{3x+2}}{3}$ (c) $\frac{a^{3x+2}}{3loga}$ (d) 3 log a (a^{3x+2})

27) $\int_1^e logx$ dx = _____ +c

(a) 1 (b) e-1 (c) e+1 (d) 0

28) $\int_{\theta}^{\frac{\pi}{\theta}} x$ sin x dx =

(a) $\frac{\pi}{4}$ (b) $\frac{\pi}{2}$ (c) π (d) 1

29) $\int_{-\frac{\pi}{2}}^{\frac{\pi}{2}} sinxdx =$

(a) 1 (b) 2 (c) -1 (d) -2

30) The value of $\int_{\theta}^{\frac{\pi}{\theta}} cosxe^{sinx}dx =$

(a) 1 (b) e-1 (c) 0 (d) -1

31) The value of the integral $\int_{\theta}^{\frac{\pi}{\theta}} \frac{\sqrt{cosx}}{\sqrt{cosx}+\sqrt{sinx}}dx =$

(a) 0 (b) $\frac{\pi}{2}$ (c) $\frac{\pi}{4}$ (d) none of these

32) $\int \frac{2}{1-cos2x}$ = _____ +c

(a) - cot x (b) cot x (c) sec x (d) tan x

33) $\int e^x a^x dx$ = _____ +c

(a) $\frac{a^x}{loga}$ (b) $\frac{(ae)^x}{\log(ae)}$ (c) $\frac{a^x}{log(ae)}$ (d) $\frac{e^x}{loga}$

34) $\int \frac{1}{1+sinx}$ dx = _____ +c

(a) tan x - sec x (b) sec x - tan x (c) - tan x - sec x (d) tan x +sec x

35) If f'(x) = x - $\frac{1}{x^2}$ and f(1) = $\frac{1}{2}$ then f(x) = _____

(a) $\frac{x^2}{2}+\frac{1}{x}+c$ (b) $\frac{x^2}{2}-\frac{1}{x}-1$ (c) $\frac{x^2}{2}+\frac{1}{x}-1$ (d) $\frac{x^2}{2}-\frac{1}{x}+1$

36) $\int$ sec^2 (7-4x) dx = _____ +c

(a) $-\frac{1}{4}tan(7-4x)$ (b) $\frac{1}{7}tan(7-4x)$ (c) $\frac{1}{4}tan(7-4x)$ (d) $\frac{1}{7}tan(7-4x)$

37) $\int \frac{e^x+1}{e^x+x}$ dx = _____ +c

(a) log |e^x +1| (b) log |e^x +x| (c) log |e^x -1| (d) log |e^x -x|

38) $\int$ x cos x dx = _____ +c.

(a) x sin x - cos x (b) -x sin x + cos x (c) -x sin x - cos x (d) x sin x + cos x

39) $\int_4^9 \frac{1}{\sqrt{2}}$ dx =

(a) 0 (b) 1 (c) 2 (d) 4

40) $\int_0^1 \frac{1}{2x-3}$ dx = _____

(a) $\frac{1}{2}log3$ (b) $-\frac{1}{2}log3$ (c) $\frac{1}{2}log1$ (d) 0

41) $\int_1^4 f(x)dx$, where f(x) = $\begin{cases} 7x+3 & if \quad 1 \le x \le 3 \\ 8x & if \quad 3 \le x \le 4 \end{cases}$ is _____.

(a) 58 (b) 60 (c) 62 (d) 52

42) $\int_{-\frac{\pi}{2}}^{\frac{\pi}{2}} sin^{71}x$ dx = _____

(a) 1 (b) 0 (c) -1 (d) 2π

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43) Evaluate $\int \sqrt{2x+1dx}$

44) Evaluate $\int \frac{dx}{(2x+3)^2}$

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

46) Evaluate $\int \left(x^3 + 7\right)(x - 4)dx$

47) Integrate the following with respect to x.
$\sqrt{3x + 5}$

48) Integrate the following with respect to x. $\left(9x^2 - \frac{4}{x^2}\right)^2$

49) Integrate the following with respect to x.
(3 + x)(2 − 5x)

50) Integrate the following with respect to x. $\frac{8x+13}{\sqrt{4x+7}}$

51) If f ' (x) = $8x^3$ − 2x and f (2)= 8, then find f (x)

52) Evaluate $\int \frac{3x^2+2x+1}{x} dx$

53) Evaluate $\int \frac{2}{3x+5} dx$

54) Integrate the following with respect to x.

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

55) Integrate the following with respect to x.
$\frac{x^4-x^2+2}{x-1}$

56) Integrate the following with respect to x.
$\frac{x^3}{x+2}$

57) Evaluate $\int \frac{e^x+7}{e^x} dx$

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

59) Evaluate $\int (2sinx - 5cos)dx$

60) Evaluate $\int sin^2 x dx$

61) Evaluate $\int \frac{cos2x}{sin^2 x cos^2 x} dx$

62) Evaluate $\int \sqrt{1 + sin2x \quad dx}$

63) Integrate the following with respect to x.
2cos x − 3sin x + 4sec^2 x − 5$cosec^2$x

64) Integrate the following with respect to x.
$\sqrt{1 - sin2x}$

65) Evaluate $\int_{\frac{\pi}{6}}^{\frac{\pi}{3}} sinx$ dx

66) Evaluate $\int_0^{\infty} e^{-\frac{x}{2}} dx$

67) If $\int_1^a 3x^2$ dx = -1, then find the value of a (a ∈ R).

68) If f(x) = $\begin{cases} x^2, & -2 \leq x < 1 \\ x, & 1 \leq x < 2 \\ x-4, & 2 \leq x \leq 4 \end{cases}$, then find the following

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

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

(iii) $\int_2^3 f(x)dx$

(iv) $\int_{-2}^{1.5} f(x)dx$

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

69) Using second fundamental theorem, evaluate the following:
$\int_0^1 e^{2x} dx$

70) Using second fundamental theorem, evaluate the following:
$\int_0^{\frac{1}{4}} \sqrt{1-4} dx$

71) Evaluate $\int_{-1}^{1} \frac{x^5 dx}{a^2 - x^2}$

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

73) Evaluate the following integrals:
$\int \sqrt{2x^2 - 3}$ dx

74) Evaluate $\int a^{3log_a x} dx$

75) Evaluate $\int \frac{2cos^2 x - cos2x}{sin^2 x}$

76) Evaluate $\int \tan^2 x$ dx

77) Evaluate $\int \frac{2 + 3cosx}{sin^2 x} dx$

78) Evaluate $\int \frac{2^x + 3^x}{5^x} dx$

79) If f'(x) = $8x^3 - 2x^2$, f(2) = 1, find f(x)

80) If $\int_0^1 \left(3x^2 + 2x + k\right) dx = 0$, find k.

81) Evaluate $\int_0^{\pi} sin^2 x \quad dx$

82) If $\int_0^a 3x^2 dx = 8$ find the value of a

83) Evaluate $\int \frac{ax^2 + bx + v}{\sqrt{x}} dx$

84) Evaluate $\int \frac{2x^2 - 14x + 24}{x - 3} dx$

85) Evaluate $\int \frac{x+2}{\sqrt{2x+3}} dx$

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

87) Integrate the following with respect to x. $\sqrt{x}(x^3 - 2x + 3)$

88) Integrate the following with respect to x. $\frac{1}{\sqrt{x+1}+\sqrt{x-1}}$

89) If f'(x) = x + b, f (1)= 5 and f (2) = 13, then find f (x)

90) Evaluate $\int \frac{x^2+2x+3}{x+1}dx$

91) Evaluate $\int \frac{x^2+5x^2-9}{x+2}dx$

92) Evaluate $\int \frac{7x-1}{x^2-5x+6}dx$

93) Integrate the following with respect x.
$\frac{x^3+3x^2-7x+11}{x+5}$

94) Integrate the following with respect to x.
$If \quad f'x = \frac{1}{x} and f(1) = \frac{\pi}{4}, \quad then \quad find f(x)$

95) Evaluate $\int 3^{2x+3}dx$

96) Evaluate $\int \frac{5+5e^{2x}}{e^x+e^{-x}}dx$

97) Integrate the following with respect to x.
$e^{x \log a} + e^{a \log a} - e^{n \log x}$

98) Integrate the following with rexpect to x
$\frac{a^x - e^{xlogb}}{e^{xloga}b^x}$

99) Integrate the following with respect to x.
$(e^x + 1)^2 e^x$

100) Integrate the following with respect to x.
$\frac{e^{3x}-e^{-3x}}{e^x}$

101) Integrate the following with respect to x.
$\frac{e^{3x}+e^{5x}}{e^x+e^{-x}}$

102) If f ' (x) = ex and f (0)= 2, then find f (x)

103) Evaluate $\int \cos^3 x\, dx$

104) Integrate the following with respect to x.
$\sin^3 x$

105) Integrate the following with respect to x.
$\frac{cos2x+2sin^2x}{cos^2x}$

106) Integrate the following with respect to x.
$\frac{1}{sin^2xcos^2x}[Hint: sin^2 + cos^2x = 1]$

107) Evaluate $\int xe^x\, dx$

108) Evaluate $\int x^3e^x dx$

109) Evaluate $\int x^3 \log x\, dx$

110) Evaluate $\int \left(x^2 - 2x + 5\right)e^{-x}dx$

111) Integrate the following with respect to x.
xe^{-x}

112) Integrate the following with respect to x.
x^3e3^x

113) Integrate the following with respect to x.
log x

114) Integrate the following with respect to x.
x log x

115) Integrate the following with respect to x.
x^n log x

116) Integrate the following with respect to x.
$x^5e^{x^2}$

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

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

119) Evaluate $\int x^3e^{x^2}dx$

120) Evaluate $\int_0^1(x^3+7x^2-5x)$ dx

121) Find the integration for $\frac{dy}{dx}=\frac{2x}{5x^2+1}$ with limiting values as 0 and 1

122) Evaluate $\int_0^1(e^x-4a^x+2+\sqrt[3]{x})dx$

123) Evaluate $\int_{\frac{\pi}{\theta}}^{} cos^2xdx$

124) Evaluate $\int_0^1[e^{alogx}+e^{xloga}]dx$

125) Using second fundamental theorem, evaluate the following:
$\int_1^2\frac{xdx}{x^2+1}$

126) Using second fundamental theorem, evaluate the following:
$\int_{\frac{\pi}{\theta}}^{}\sqrt{1+cosx}dx$

127) Using second fundamental theorem, evaluate the following:
$\int_1^2\frac{x-1}{x^2}dx$

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

129) Evaluate the following:
$\int_0^2f(x)dx$ where$f(x)=\begin{cases}3-2x-x^2, x\le 1\\ x^2+2x-3, 1<x\le 2\end{cases}$

130) Evaluate the following:
$\int_{-1}^1f(x)dx$ where f(x) = $\begin{cases}x, & x \ge 0\\ -x, & x < 0\end{cases}$

131) Evaluate the following:
$f(x)=\begin{cases}cx, 0<x<1\\ 0, \quad otherwise\end{cases}$ Find 'c' if $\int_0^1f(x)dx=2$

132) Evaluate $\int_{\frac{\pi}{2}}^{\frac{\pi}{2}} cosx$ dx

133) Evaluate the following using properties of definite integrals:

$\int_{\frac{\pi}{2}}^{\frac{\pi}{2}} sin^2\theta d\theta$

134) Evaluate the following using properties of definite integrals:

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

135) If f(x) = $f(x) = \begin{cases} x^2e^{-2x}, x \geq 0 \\ 0, otherwise \end{cases}$, then evaluate $\int_0^\infty f(x)dx$

136) Evaluate the integral as the limit of a sum: $\int_0^1 xdx$

22 x 5 = 110

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

138) Evaluate $\int \frac{3x^2+6x+1}{(x+3)\left(x^2+1\right)}dx$

139) Integrate the following with respect x

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

140) Integrate the following with respect to x.

$\frac{4x^2+2x+6}{(x+1)^2(x-3)}$

141) Integrate the following with respect to x.

$\frac{3x^2-2x+5}{(x-1)\left(x^2+5\right)}$

142) Evaluate $\int (logx)^2 dx$

143) $\int_2^3 \frac{x^4+1}{x^2}dx$

144) Evaluate $\int_{-1}^{1}(x^3 + 3x^2)^3$ (x^2 + 2x)dx

145) Evaluate $\int_a^b \frac{\sqrt{logx}}{x}dx$ a,b > 0

146) Evaluate $\int_{-1}^{1} x\sqrt{x+1}dx$

147) Evaluate $\int_0^\infty x^2e^{-x^3}dx$

148) Evaluate $\int_1^2 \frac{1}{(x+1)(x+2)}dx$

149) Evaluate $\int_1^e logx$ dx

150) Evaluate $\int_{\theta}^{\frac{\pi}{2}} xsinxdx$

151) If $\int_a^b dx = 1$ and $\int_a^b xdx = 1$, then find a and b

152) Evaluate $\int_1^4 f(x)dx$, where $\begin{cases} 7x+3, if 1 \leq x \leq 3 \\ 8x, if 3 \leq x \leq 4 \end{cases}$

153) Evaluate $\int_{\theta}^{\frac{\pi}{\partial}} \frac{sinx}{sinx+cosx}$ dx

154) Evaluate $\int_{2}^{5} \frac{\sqrt{x}}{\sqrt{x}+\sqrt{7-x}}$ dx

155) Evaluate the following using properties of definite integrals:

$\int_{\theta}^{\frac{\pi}{\partial}} \frac{sin^7 x}{sin^7 x+cos^7 x} dx$

156) Evaluate the following using properties of definite integrals:

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

157) Evaluate the following using properties of definite integrals:

$\int_0^1 \frac{x}{(1-x)^{\frac{3}{4}}} dx$

158) If f'(x) = a sin x + b cos x and f'(0) = 4, f(0) = 3, $f\left(\frac{\pi}{2}\right)$ = 5, find f(x).