(60) $\int \frac{dx}{15+4x-4x^2} = k \log\left|\frac{3+2x}{5-2x}\right| + c$ then $k =$

(a) $\frac{1}{16}$ (b) $\frac{1}{8}$ (c) $\frac{1}{4}$ (d) $\frac{1}{32}$

(61) If $\int \frac{\sin 2x\, dx}{3\sin^4 x - 4\sin^2 x + 1} = k \log\left|\frac{3\sin^2 x - 3}{3\sin^2 x - 1}\right| + c$ then $k^2 =$

(a) $\frac{1}{2}$ (b) $\frac{1}{4}$ (c) $\frac{1}{16}$ (d) 4

(62) If $\int \frac{dx}{5+4\cos x} = k \tan^{-1}\left(\lambda \tan\frac{x}{2}\right) + c$ then $(k, \lambda) =$

(a) $\left(\frac{2}{3}, 3\right)$ (b) $\left(\frac{2}{3}, \frac{1}{2}\right)$ (c) $\left(\frac{2}{3}, \frac{1}{3}\right)$ (d) $\left(\frac{1}{3}, \frac{2}{3}\right)$

(63) If $\int \frac{dx}{3+2\sin x - \cos x} = k \tan^{-1}\left(2\tan\frac{x}{2} + 1\right) + c$ then $k =$

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

(64) $\int \frac{dx}{3-2\cos 2x} =$

(a) $\frac{1}{\sqrt{5}} \tan^{-1}(\sqrt{5}\tan x) + c$ (b) $\sqrt{5} \tan^{-1}\left(\frac{\tan x}{\sqrt{5}}\right) + c$

(c) $\frac{1}{5} \tan^{-1}(\sqrt{5}\tan x) + c$ (d) $\frac{1}{\sqrt{3}} \tan^{-1}(\sqrt{5}\tan x) + c$

(65) $\int \frac{dx}{2\sin 2x - 3} = k \tan^{-1}\left(\frac{3\tan x - 2}{\sqrt{5}}\right) + c$ then $k =$

(a) $-\frac{1}{\sqrt{5}}$ (b) $\sqrt{5}$ (c) $-\sqrt{5}$ (d) $\frac{1}{\sqrt{5}}$

Relevant synopsis :

(1) $\int \frac{1}{(x+a)(x+b)} dx = \frac{1}{b-a} \log\left|\frac{x+a}{x+b}\right| + c$

(2) $\int \frac{x}{(x+a)(x+b)} dx = \frac{1}{b-a}\left[b \log|x+b| - a \log|x+a|\right] + c$

eg $\int \frac{x}{(x+2)(x+5)} dx = \frac{1}{5-2}\left[5 \log|x+5| - 2 \log|x+2|\right] + c$

$\therefore \int \frac{x}{(x+2)(x+5)} dx = \frac{1}{3}\left[5 \log|x+5| - 2 \log|x+2|\right] + c$

(66) If $\int \frac{1}{(x+2)(x+5)}\,dx = k\log\left|\frac{x+2}{x+5}\right| + c$ then $k =$

(a) 3 (b) -3 (c) $\frac{1}{3}$ (d) $\frac{-1}{3}$

(67) If $\int \frac{x}{(x+1)(x+4)}\,dx = k\log|x+4| + \lambda\log|x+1| + c$ then $(k, \lambda) =$

(a) $\left(\frac{4}{3}, \frac{1}{3}\right)$ (b) $\left(\frac{1}{3}, \frac{4}{3}\right)$ (c) $\left(\frac{4}{3}, \frac{-1}{3}\right)$ (d) $\left(\frac{-4}{3}, \frac{-1}{3}\right)$

(68) If $\int \frac{2x}{4-3x-x^2}\,dx = k\log|1-x| + \lambda\log|x+4| + c$ then $(k, \lambda) =$

(a) $\left(-\frac{2}{5}, \frac{-8}{5}\right)$ (b) $\left(\frac{2}{5}, \frac{8}{5}\right)$ (c) $\left(-\frac{2}{5}, \frac{8}{5}\right)$ (d) $\left(\frac{2}{5}, \frac{-8}{5}\right)$

(69) If $\int \frac{x^2+x-1}{x^2+x-6}\,dx = x + k\log|x+3| + \lambda\log|x-2| + c$ then $(k, \lambda) =$

(a) $(1, -1)$ (b) $(-1, -1)$ (c) $(1, 1)$ (d) $(-1, 1)$

(70) If $\int \frac{1-x^2}{x(1-2x)}\,dx = \frac{x}{2} + k\log|x| + \lambda\log|1-2x| + c$ then $k + \lambda =$

(a) $\frac{5}{2}$ (b) $-\frac{1}{2}$ (c) $\frac{7}{4}$ (d) $\frac{1}{4}$

(71) $\int \frac{3\,dx}{(x^2+1)(x^2+4)} =$

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

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

(72) If $\int \frac{x^2\,dx}{x^4+5x^2+6} = k\tan^{-1}\left(\frac{x}{\sqrt{3}}\right) + \lambda\tan^{-1}\left(\frac{x}{\sqrt{2}}\right) + c$ then $(k, \lambda) =$

(a) $(\sqrt{3}, -\sqrt{2})$ (b) $(\sqrt{3}, \sqrt{2})$ (c) $\left(\frac{1}{\sqrt{3}}, \frac{1}{\sqrt{2}}\right)$ (d) $\left(\frac{1}{\sqrt{3}}, \frac{-1}{\sqrt{2}}\right)$

(73) If $\int \frac{2x^2-1}{(x^2+4)(x^2-5)}\,dx = k\tan^{-1}\left(\frac{x}{2}\right) + \lambda\log\left|\frac{x-\sqrt{5}}{x+\sqrt{5}}\right| + c$ then $(k, \lambda) =$

(a) $\left(\frac{1}{2}, \frac{-1}{2\sqrt{5}}\right)$ (b) $\left(\frac{1}{2}, \frac{1}{2\sqrt{5}}\right)$ (c) $\left(1, \frac{1}{2\sqrt{5}}\right)$ (d) $\left(\frac{1}{2}, \frac{1}{\sqrt{5}}\right)$

(74) If $\int \frac{x^2+2}{(x-1)(x+2)(x+3)}\,dx = k\log|x-1| + \lambda\log|x+2| + \mu\log|x+3| + c$

then $(k, \lambda, \mu) =$ (a) $\left(\frac{1}{4}, 2, \frac{11}{4}\right)$ (b) $\left(\frac{1}{4}, 2, \frac{-11}{4}\right)$ (c) $\left(\frac{1}{4}, -2, \frac{11}{4}\right)$ (d) $\left(\frac{1}{4}, -2, \frac{-11}{4}\right)$

(75) If $\int \frac{x^3-4x^2+3x+11}{x^2-5x+6}\,dx = \frac{x^2}{2} - x + k\log|x-2| + \lambda\log|x-3| + c$ then $(k,\lambda) =$

(a) $(9, 11)$ (b) $(-9, 11)$ (c) $(9, -11)$ (d) $(-9, -11)$

(76) If $\int \frac{x\,dx}{(x^2-a^2)(x^2-b^2)} = k\log\left|\frac{x^2-a^2}{x^2-b^2}\right| + c$ then $k =$

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

(77) If $\int \frac{x^2\,dx}{(x^3+1)(x^3+2)} = k\log\left|\frac{x^3+1}{x^3+2}\right| + c$ then $k =$

(a) $-\frac{1}{3}$ (b) $\frac{1}{6}$ (c) $-\frac{1}{6}$ (d) $\frac{1}{3}$

(78) If $\int \frac{\sin 2x\,dx}{(1-\cos 2x)(2-\cos 2x)} = k\log\left|\frac{1-\cos 2x}{2-\cos 2x}\right| + c$ then $k =$

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

(79) If $\int \frac{\log x\,dx}{x(1+\log x)(2+\log x)} = k\log|2+\log x| + \lambda\log|1+\log x| + c$ then $k-\lambda =$

(a) -3 (b) 3 (c) 1 (d) -1

(80) If $\int \frac{dx}{\sin x + \sin 2x} = k\log|1-\cos x| + \lambda\log|1+\cos x| + \mu\log|1+2\cos x| + c$ then

$(k, \lambda, \mu) =$ (a) $\left(\frac{1}{6}, \frac{1}{2}, \frac{2}{3}\right)$ (b) $\left(\frac{1}{6}, \frac{-1}{2}, \frac{2}{3}\right)$ (c) $\left(\frac{1}{6}, \frac{1}{2}, \frac{-2}{3}\right)$ (d) $\left(\frac{1}{6}, \frac{-1}{2}, \frac{-2}{3}\right)$

(81) If $\int \frac{3x+1}{(x-2)^2(x+2)}\,dx = k\log|x-2| + \frac{\lambda}{x-2} + \mu\log|x+2| + c$ then

$(k, \lambda, \mu) =$ (a) $\left(\frac{5}{16}, \frac{7}{4}, \frac{5}{16}\right)$ (b) $\left(\frac{5}{16}, \frac{-7}{4}, \frac{-5}{16}\right)$ (c) $\left(\frac{5}{16}, \frac{-7}{4}, \frac{5}{16}\right)$ (d) $\left(\frac{5}{16}, \frac{7}{4}, \frac{-5}{16}\right)$

(82) $\int \frac{3x-1}{(x-2)^2}\,dx =$

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

(c) $3\log|x-2| + \frac{5}{x-2} + c$ (d) $3\log|x-2| - \frac{5}{x-2} + c$

(83) $\int \frac{\sin 2x\,dx}{(3+2\sin x)^2} = k\log|3+2\sin x| + \frac{\lambda}{3+2\sin x} + c$ then $(k, \lambda) =$

(a) $\left(\frac{1}{2}, \frac{3}{2}\right)$ (b) $\left(\frac{1}{2}, \frac{-3}{2}\right)$ (c) $\left(\frac{1}{2}, \frac{2}{3}\right)$ (d) $\left(\frac{1}{2}, \frac{-2}{3}\right)$

Home Work MCQs (Contd)

(61) $\int \frac{dx}{x(x+1)} =$

(a) $\log\left|\frac{x+1}{x}\right|+c$ (b) $\log\left|\frac{x}{x+1}\right|+c$ (c) $2\log\left|\frac{x}{x+1}\right|+c$ (d) $2\log\left|\frac{x+1}{x}\right|+c$

(62) $\int \frac{x+1}{x^2+5x+6}\,dx =$

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

(63) $\int \frac{x\,dx}{(x+2)(x+5)} = K\log|x+5| + \lambda\log|x+2|+c$ then $(K,\lambda) =$

(a) $\left(\frac{5}{3},\frac{2}{3}\right)$ (b) $\left(-\frac{5}{3},\frac{2}{3}\right)$ (c) $\left(\frac{5}{3},-\frac{2}{3}\right)$ (d) $\left(-\frac{5}{3},-\frac{2}{3}\right)$

(64) $\int \frac{4x}{2x^2+x-1}dx = K\log|2x-1| + \lambda\log|x+1|+c$ then $(K,\lambda) =$

(a) $\left(\frac{2}{3},\frac{2}{3}\right)$ (b) $\left(\frac{2}{3},-\frac{2}{3}\right)$ (c) $\left(\frac{2}{3},\frac{4}{3}\right)$ (d) $\left(\frac{2}{3},-\frac{4}{3}\right)$

(65) If $\int \frac{x^2+1}{x^2-5x+6}\,dx = x + K\log|x-3| + \lambda\log|x-2|+c$ then $K+\lambda =$

(a) 5 (b) -5 (c) 2 (d) -2

(66) If $\int \frac{dx}{(x^2+4)(x^2+9)} = A\tan^{-1}\left(\frac{x}{2}\right) + B\tan^{-1}\left(\frac{x}{3}\right)+c$ then $A-B =$

(a) $-\frac{1}{6}$ (b) $\frac{1}{30}$ (c) $-\frac{1}{30}$ (d) $\frac{1}{6}$

(67) If $\int \frac{x^2\,dx}{(x^2+2)(2x^2+1)} = K\tan^{-1}\left(\frac{x}{\sqrt{2}}\right) + \lambda\tan^{-1}(\sqrt{2}x)+c$ then $(K,\lambda) =$

(a) $\left(\frac{\sqrt{2}}{3},\frac{1}{3\sqrt{2}}\right)$ (b) $\left(\frac{\sqrt{2}}{3},-\frac{1}{3\sqrt{2}}\right)$ (c) $\left(\frac{2}{3},\frac{1}{3\sqrt{2}}\right)$ (d) $\left(\frac{2}{3},-\frac{1}{3\sqrt{2}}\right)$

(68) If $\int \frac{2x^2+3}{(x^2-1)(x^2-4)}\,dx = \log\left|\left(\frac{x-2}{x+2}\right)^a\left(\frac{x-1}{x+1}\right)^b\right|+c$ then $(a,b) =$

(a) $\left(\frac{11}{12},\frac{5}{6}\right)$ (b) $\left(\frac{11}{12},-\frac{5}{6}\right)$ (c) $\left(-\frac{11}{12},\frac{5}{6}\right)$ (d) $\left(-\frac{11}{12},-\frac{5}{6}\right)$

(69) If $\int \frac{2x^3+3x^2-3}{2x^2-x-1}\,dx = \frac{x^2}{2} + 2x + K\log|2x+1| + \lambda\log|x-1|+c$

then $(K,\lambda) =$ (a) $\left(\frac{5}{6},\frac{1}{3}\right)$ (b) $\left(\frac{1}{6},\frac{2}{3}\right)$ (c) $\left(\frac{5}{6},\frac{2}{3}\right)$ (d) $\left(\frac{1}{6},\frac{1}{3}\right)$

(70) $\int \frac{dx}{x(x-2)(x-4)} = k\log|x| + \lambda\log|x-2| + \mu\log|x-4| + c$ then $(k, \lambda, \mu) =$

(a) $\left(\frac{1}{8}, -\frac{1}{4}, \frac{1}{8}\right)$ (b) $\left(\frac{1}{8}, -\frac{1}{4}, -\frac{1}{8}\right)$ (c) $\left(\frac{1}{8}, \frac{1}{4}, -\frac{1}{8}\right)$ (d) $\left(\frac{1}{8}, \frac{1}{4}, \frac{1}{8}\right)$

(71) $\int \frac{2x\,dx}{(x^2+2)(x^2+3)} = k\log\left|\frac{x^2+2}{x^2+3}\right| + c$ then $k =$

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

(72) If $\int \frac{e^x\,dx}{(1+e^x)(2+e^x)} = k\log\left|\frac{1+e^x}{2+e^x}\right| + c$ then $k =$

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

(73) $\int \frac{dx}{x\log x\,(2+\log x)} =$

(a) $\frac{1}{2}\log\left|\frac{2+\log x}{\log x}\right| + c$ (b) $\frac{1}{2}\log\left|\frac{\log x}{2+\log x}\right| + c$ (c) $\frac{1}{4}\log\left|\frac{2+\log x}{\log x}\right| + c$ (d) $\frac{1}{4}\log\left|\frac{\log x}{2+\log x}\right| + c$

(74) If $\int \frac{3x-2}{(x+1)^2(x+3)}\,dx = k\log|x+1| + \frac{\lambda}{x+1} + \mu\log|x+3| + c$

then $(k, \lambda, \mu) =$ (a) $\left(\frac{11}{4}, \frac{5}{2}, \frac{11}{4}\right)$ (b) $\left(\frac{11}{4}, -\frac{5}{2}, \frac{11}{4}\right)$ (c) $\left(\frac{11}{4}, -\frac{5}{2}, -\frac{11}{4}\right)$ (d) $\left(\frac{11}{4}, \frac{5}{2}, -\frac{11}{4}\right)$

(75) If $\int \frac{x^2+1}{(x+1)^2}\,dx = x + k\log|x+1| + \frac{\lambda}{x+1} + c$ then $(k, \lambda) =$

(a) $(2, 2)$ (b) $(2, -2)$ (c) $(-2, 2)$ (d) $(-2, -2)$

(76) If $\int \frac{2x+7}{(x-4)^2}\,dx = k\log|x-4| + \frac{\lambda}{x-4} + c$ then $(k, \lambda) =$

(a) $(4, -15)$ (b) $(4, 15)$ (c) $(2, -15)$ (d) $(2, 15)$

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

(a) $3\log|\sin x - 2| + \frac{4}{\sin x - 2} + c$ (b) $3\log|\sin x - 2| - \frac{4}{\sin x - 2} + c$

(c) $3\log|\sin x - 2| + \frac{2}{\sin x - 2} + c$ (d) $3\log|\sin x - 2| - \frac{2}{\sin x - 2} + c$

ANSWERS (HOMEWORK)

(1) c	(2) a	(3) b	(4) a	(5) d	(6) b	(7) d	(8) c	(9) c	(10) a
(11) d	(12) b	(13) c	(14) b	(15) c	(16) a	(17) d	(18) a	(19) c	(20) d
(21) a	(22) b	(23) a	(24) c	(25) d	(26) b	(27) b	(28) b	(29) c	(30) b
(31) c	(32) d	(33) c	(34) a	(35) c	(36) a	(37) b	(38) d	(39) b	(40) d
(41) a	(42) a	(43) d	(44) b	(45) c	(46) d	(47) a	(48) c	(49) b	(50) a
(51) c	(52) b	(53) a	(54) b	(55) c	(56) d	(57) a	(58) b	(59) c	(60) a
(61) b	(62) a	(63) c	(64) c	(65) a	(66) d	(67) b	(68) b	(69) c	(70) a
(71) c	(72) a	(73) b	(74) d	(75) d	(76) c	(77) b			