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 Dept: MBBS
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 MATRIC NO: 19/mhso1/824

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

Solution

$$\frac{11-3x}{x^2+2x-3} = \frac{A}{x-1} + \frac{B}{x+3}$$

$$\therefore 11-3x = A(x+3) + B(x-1)$$

To find A $x=1$

$$11-3(1) = A(1+3) + B(1-1)$$

$$8 = 4A$$

$$\therefore A = 8/4 = 2$$

To find B, $x = -3$

$$11-3(-3) = A(-3+3) + B(-3-1)$$

$$11+9 = -4B$$

$$20 = -4B$$

$$B = 5$$

$$\int \frac{11-3x}{x^2+2x-3} dx = \int \frac{2}{x-1} dx - \int \frac{5}{x+3} dx \Rightarrow$$

$$2 \ln(x-1) - 5 \ln(x+3) + C$$

$$\therefore \int \frac{11-3x}{x^2+2x-3} = 2 \ln(x-1) - 5 \ln(x+3) + C$$

2) $\int \frac{4x-b}{x^2-2x-3} dx$

Soln

$$\frac{4x-b}{x^2-2x-3} = \frac{A}{x+1} + \frac{B}{x-3}$$

$$\therefore 4x-b = A(x-3) + B(x+1)$$

$$x=1 \Rightarrow (x+3)$$

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$$-35 = C(-3+1)$$

$$\therefore C = (-2)(-35)$$

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

$$= \ln(x^2+1) + \ln(x+3)$$

$$+ \ln(x)$$

$$= \frac{35}{x-1} - \frac{9x}{x^2-3}$$

To get A, $x = -1$
 $4(-1) - 6 = A(1-3)$

$-4 - 6 = -2A$

$-10 = -2A$

$A = 5/2$

To get B, $x = 3$

$4(3) - 6 = B(3+1)$

$12 - 6 = 4B$

$6 = 4B$

$B = 3/2$

$B = 3/2$

$\int \frac{4x-6}{x^2-2x-3} dx = \int \frac{5}{2(x+1)} dx + \int \frac{3}{2(x-3)} dx$

$\frac{5}{2} \ln|x+1| + \frac{3}{2} \ln|x-3| + C$

$\therefore \int \frac{4x-6}{x^2-2x-3} dx = \frac{5}{2} \ln|x+1| + \frac{3}{2} \ln|x-3| + C$

3) $\int \frac{2x^2-9x-35}{(x+1)(x-2)(x+3)} dx$

Soln

$\frac{2x^2-9x-35}{(x+1)(x-2)(x+3)} = \frac{A}{x+1} + \frac{B}{x-2} + \frac{C}{x+3}$

$\therefore 2x^2-9x-35 = A(x-2)(x+3) + B(x+1)(x+3) + C(x+1)$

To get A, $x = -1$
 $2(-1)^2 - 9(-1) - 35 = A(-1-2)(-1+3)$

$2 + 9 - 35 = -6A$

$-24 = -6A$

$\therefore A = 4$

$-35 = B(2+1)(2+3)$

$35 = 15B$

$15B \cdot B = -3$

$C = -3$

$9(-3) - 35 = C(-2)(-3)$

$27 - 35 = C(-2)(-3)$

$D = 10C$

$C = 1$

$\frac{-9x-35}{(x-2)(x+3)}$

$x+1) - 3(\ln|x-2|) +$

$\frac{2x^2-9x-35}{(x+1)(x-2)(x+3)}$

$=$

To get B, $x=2$
 $2(2)^2 - 9(2) - 35 = B(2+1)(2+3)$

$$8 - 18 - 35 = 15B$$

$$-45 = -15B \therefore B = -3$$

To get C, $x = -3$

$$2(-3) - 9(-3) - 35 = C(-3+1)$$

$$18 + 27 - 35 = C(-2)(-5)$$

$$10 = 10C$$

$$C = 1$$

$$\therefore \int \frac{2x^2 - 9x - 35}{(x+1)(x-2)(x+3)} dx = \int \frac{4}{x+1} dx - \int \frac{3}{x-2} dx + \int \frac{1}{x+3} dx$$

$$4 \ln(x+1) - 3 \ln(x-2) + \ln(x+3) + C$$

$$\therefore \int \frac{2x^2 - 9x - 35}{(x+1)(x-2)(x+3)} dx = 4 \ln(x+1) - 3 \ln(x-2) + \ln(x+3) + C$$