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 Department: MBBS  
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Assignment

①  $\int \frac{11-3x}{x^2+2x-3} dx$

Soln

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

$\frac{11-3x}{(x-1)(x+3)} = \frac{A}{x-1} + \frac{B}{x+3}$

Multiply through by the common L.C.M.  $(x^2+2x-3)$

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

F(1)

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

$11-3 = 4A+0$

$8 = 4A$

$A = 2$

F(-3)

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

$11+9 = 0-4B$

$20 = -4B$

$B = -5$

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

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

②  $\int \frac{4x-16}{x^2-2x-3} dx$

Soln

$\int \frac{4x-16}{x^2-2x-3} dx$

$\frac{4x-16}{(x+1)(x-3)} = \frac{A}{x+1} + \frac{B}{x-3}$

$4x-16 = A(x-3) + B(x+1)$

Test for  $x=3$

$4(3)-16 = A(3-3) + B(3+1)$

$12-16 = 0+4B$

$-4 = 4B$

$B = -1$

Test for  $x=-1$

$4(-1)-16 = A(-1-3) + B(-1+1)$

$-4-16 = A(-4) + B(0)$

$-20 = -4A$

$A = 5$

$\int \frac{4x-16}{(x+1)(x-3)} = \frac{5}{x+1} + \frac{-1}{x-3}$

$\int \frac{4x-16}{(x+1)(x-3)} = \int \frac{5}{x+1} dx + \int \frac{-1}{x-3} dx$

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

Ans

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

Soln

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

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

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

$= A(x^2+x-6) + B(x^2+4x+3) + C(x^2-x-2) = 2x^2-9x-35$

$= x^2(A+B+C) + x(A+4B-C) - 6A+3B-2C = 2x^2-9x-35$

$A+B+C = 2$  — (i)

$A+4B-C = -9$  — (ii)

$-6A+3B-2C = -35$  — (iii)

$A = 2-B-C$  — (iv)

Let  $x=2$

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

$A(0) + B(15) + C(0) = 8-18-35$

$15B = -45$

$B = -3$

Let  $x=-1$

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

$A(-6) + B(0) + C(0) = 2+9-35$

$-6A = -24$

$A = 4$

Let  $x=-3$

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

$A(0) + B(0) + C(10) = 18+27-35$

$10C = 10$   $C = 1$

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

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

$$= \underline{\underline{4 \ln|x+1| - 3 \ln|x-2| + \ln|x+3| + C}}$$

Ans