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DEPT : MBBS.

ASS.

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

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

Multiply through by $(x+3)(x-1)$

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

using

$x = -3$ and $x = 1$

$f(-3) \Rightarrow 11 - 3(-3) = A(-3-1)$

$11 + 9 = A(-4)$

$20 = -4A$

$A = -5$

$f(1) \Rightarrow 11 - 3(1) = B(1+3)$

$11 - 3 = 4B$

$8 = 4B$

$B = 2$

$\Rightarrow \frac{11 - 3x}{(x+3)(x-1)} = \frac{-5}{(x+3)} + \frac{2}{(x-1)}$

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

Let $u = x + 3$ | Let $u = x - 1$

$du = dx$ | $du = dx$

$\Rightarrow -5 \int \frac{du}{u}$ | $\Rightarrow 2 \int \frac{du}{u}$

$= -5 \ln u$ | $= 2 \ln u$

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

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

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

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

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

multiply through by $(x+1)(x-2)$

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

using $x=-1$ or $x=3$

$f(-1) \Rightarrow 4(-1)-16 = A(-1-3)$

$-20 = -4A$

$A = 5$ //

$f(3) \Rightarrow 4(3)-16) = B(B+1)$

$12-16 = 4B$

$-4 = 4B$

$B = -1$ //.

$\Rightarrow \int \frac{5}{x+1}\,dx + \int \frac{-1\,dx}{x-3} = \int \frac{4x-16}{x^2-2x-3}\,dx.$

Let $u = x+1$

$du = dx$

$\Rightarrow 5\int \frac{du}{u}$

$= 5\ln u$

$= 5\ln(x+1)$

Let $u = x-3$

$du = dx$

$= -1\int \frac{du}{u}$

$= -1 \ln u$

$-1 \ln(x-3)$

$= 5\ln(x+1) + -1 \ln(x-3)$ //

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

Soln.

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

Multiply through by $(x+1)(x-2)(x+3)$

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

using $x = -1$ or $x = 2$ or $x = -3$

$f(-1) \Rightarrow 2(-1)^2 - 9(-1) - 35 = A(-1+3)(-1-2)$

$2 + 9 - 35 = A(2)(-3)$

$-24 = -6A$

$A = 4$,

$f(2) \Rightarrow 2(2)^2 - 9(2) - 35 = B(2+1)(2+3)$

$8 - 18 - 35 = B(3)(5)$

$-45 = 15B$

$B = -3$

$f(-3) \Rightarrow 2(-3)^2 - 9(-3) - 35 = C(-3+1)(-3-2)$

$\Rightarrow 18 + 07 - 35 = C(-2)(-5)$

$10 = 10C$

$C = 1$,

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

Let $u = x+1$ Let $u = x-2$ Let $u = x+3$

$du = dx$ $du = dx$ $du = dx$

$\Rightarrow 4\ln u$ $\Rightarrow -3\ln u$ $\Rightarrow 1\ln u$

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

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