Name: Ogudu Chidera Jane
Matric no: 19/MHS01/294
Dept: MBBS
Subject: Math & maths Assignment.

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

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

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

$Ax + 3A + Bx - B + 11 - 3x$

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

Hence

$\begin{cases} A + B = -3 \\ 3A - B = 11 \end{cases}$

To find B

$A = -3 - B$

$\therefore 3(-3-B) - B = 11$

$-9 - 3B - B = 11$

$-9 - 4B = 11$

$-4B = 20$

$B = -5$

To find A

$B = -3 - A$

$3A - (-3 - A) = 11$

$3A + 3 + A = 11$

$4A = 8$

$A = 2$

Therefore:

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

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

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

2) $\int \frac{4x-16}{x^2-2x-3}\,dx \qquad \frac{4x-16}{(x+1)(x-3)}$

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

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

$Ax - 3A + Bx + B = 4x - 16$

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

Hence

$\begin{cases} A + B = 4 \\ -3A + B = -16 \end{cases}$

To find B

$A = 4 - B$

$\therefore -3(4-B) + B = -16$

$-12 + 3B + B = -16$

$4B = -4$

$B = -1$

To find A

$B = 4 - A$

$-3A + 4 - A = -16$

$-4A = -20$

$A = 5$

Therefore.

$\frac{4x-16}{x^2-2x-3} = \frac{5}{x+1} - \frac{1}{x-3}$

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

$= 5\ln|x+1| - \ln|x-3| + C$

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

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

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

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

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

$2x^2 - 9x - 35 = Ax^2 + Ax - 6A + Bx^2 + 4Bx + 3B + Cx^2 - 6x - 2C$

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

Hence

$A + B + C = 2 \quad \cdots (i)$

$A + 4B + C = 9 \quad \cdots (ii)$

$-6A + 3B - 2C = -35 \quad \cdots (iii)$

$A = 2 - B - C \quad \cdots (iv)$

$\therefore$

$2 - B - C + 4B - C = -9$

$-2C + 3B = -11 \quad \cdots (v)$

Substituting (iv) into (iii)

$-6(2 - B - C) + 3B - 2C = -35$

$-12 + 6B + 6C + 3B - 2C = -35$

$4C + 9B = -23 \quad \cdots (vi)$

Using elimination method.

$-2C + 3B = -11$

$4C + 9B = -23$

$-6C + 9B = -33$

$4C + 9B = -23$

$-10C = -10$

$C = 1$

$4C + 9B = -23$

$4(1) + 9B = -23$

$9B = -27$

$B = -3$

Using equation (iv)

$A = 2 - B - C$

$A = 2 + 3 - 1$

$A = 4.$

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

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