NAME: OWOLABI AYODEJI DANIEL
DEPARTMENT: MEDICINE AND SURGERY (MBBS)
SUBJECT: MAT 104
MATRIC NUMBER: 19/MHS01/368

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

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

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

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

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

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

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

let x be 1

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

$\frac{8}{4} = \frac{4A}{4} + 0$

$A = 2$

let x be -3

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

$11+9 = 0-4B$

$\frac{20}{-4} = \frac{-4B}{-4}$

$B = -5$

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

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

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

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

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

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

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

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

$$\frac{4x-16}{x^2-2x-3} = \frac{A(x-3)+B(x+1)}{(x+1)(x-3)}$$

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

let x be 3

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

$$12-16 = 0+4B$$

$$B = -1$$

let x Be -1

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

$$\frac{-20}{4} = \frac{-4A}{4} + 0$$

$$A = 5$$

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

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

$5\int \frac{1}{x+1}\,dx - 1\ln x-3 + c$

i.e $5\ln x+1 - 1\ln x-3 + c$

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

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

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

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

let x be 3

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

$2(-3)^2-9(-3)-35 = A(0)+B(0)+C(-2x-5)$

$2(-3)^2-9(-3)-35 = C(+10)$

$18+27-35 = 10C$

$10 = 10C$

$C = 1$

let x be 2

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

$8-18-35 = 0+B(3\times5)+0$

$\frac{-45}{15} = \frac{15B}{15}$, $B = -3$

let x be -1

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

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

$-24 = -6A$

$A = 4$

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

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

$4\int \frac{1}{x+1}\,dx + 3\int \frac{1}{x-2}\,dx + \ln x+3 + C$

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