NAME: BENJAMIN REBECCA CHIAMAKA
DEPT: MBBS
MATRIC NO: 19/MHS01/120.

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

Solution.

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

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

$x = 1.$

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

$8 = 4A.$

$A = 2.$

$x = -3.$

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

$11+9 = -4B$

$20 = -4B$

$B = -5.$

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

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

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

2) $\int \frac{4x-6}{x^2-2x-3} dx.$

Solu.

$\frac{4x-6}{x^2-2x-3} = \frac{A}{x+1} + \frac{B}{x-3}$

$\therefore\ 4x-6 = A(x-3) + B(x+1)$

$x = -1.$

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

$-4-6 = A(-4) \cancel{+B}$

$-10 = -4A$

$A = \frac{5}{2}.$

$x = 3.$

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

$12-6 = B(4).$

$6 = 4B.$

$B = \frac{3}{2}$

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

$\frac{5}{2}\ln(x+1) + \frac{3}{2}\ln(x-3) + c.$

$\therefore\ \frac{5}{2}\ln(x+1) + \frac{3}{2}\ln(x-3) + c.$

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

Solution.

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

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

$x = -1.$

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

$2+9-35=-6A.$

$-24=-6A$

$A=4$

$B,\ x=2.$

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

$8-18-35=15B$

$-45=15B$

$B=-3$

$C,\ x=-3.$

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

$18+27-35=C(+10)$

$10=10C.$

$C=1.$

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

$\therefore 4\ln(x+1)-3\ln(x-2)+\ln(x+3)+c.$