

IYAMU UCHENNA PRECIOUS

MECHANICAL ENGINEERING

SN 28

MAT104

NAME: IYAMU UCHENNA PRECIOUS  
MATHS NO: 191806061031  
MAT 104 SN=28

ASSIGNMENT

Q1)  $\int \frac{11-3x}{x^2-x-3} dx$       $\int \frac{11-3x}{x^2+x-3}$       $\int \frac{11-3x}{x(x+3)+1(x-3)}$

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

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

$A(x-3) = 11-3(x-3)$      When  $x=3$       $-4A=20$

When  $x=1$       $A=5$

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

$4B=8$

$B=2$

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

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

$2 \ln|x-1| - 5 \ln|x+3| + C$

Q2)  $\int \frac{7x^2-9x-35}{(x+1)(x-2)(x+3)} dx$

$\frac{A}{x+1} + \frac{B}{x-2} + \frac{C}{x+3} = \frac{7x^2-9x-35}{(x+1)(x-2)(x+3)}$

$$A(x^2)(x+2) + B(x+2)(x+2) + C(x+2)(x-2)$$

$$= x^2 - 9x - 35$$

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

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

$$A+B+C=1 \quad A+2B-C=-9$$

$$2A+2B-2C=-35$$

$$A=1-B-C \quad 2(1-B-C)+2B-C=-9$$

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

$$2-3C=-9$$

$$-3C=-11 \Rightarrow C=11/3$$

$$6A=35-11$$

$$6A=24$$

$$A=4$$

$$B=-B-C \quad B=-C-2 \quad 3(1+2-2C)=11$$

$$-3(-6-2C)=-11$$

$$-9C=-5$$

$$C=1$$

$$B=-1-2$$

$$B=-3$$

$$\int \frac{4}{x+1} dx + \int \frac{-3}{x-2} dx + \int \frac{11}{5x+2} dx$$

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

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

$$x = 11 \tan \theta$$

$$\frac{dx}{d\theta} = 11 \sec^2 \theta$$

$$dx = 11 \sec^2 \theta d\theta$$

$$x^2 + 11^2 = 11^2 \tan^2 \theta + 11^2$$

$$= 11^2 (\tan^2 \theta + 1)$$

$$\tan^2 \theta + 1 = \sec^2 \theta$$

$$x^2 + 11^2 = 11^2 \sec^2 \theta$$

$$\int \frac{11 \sec^2 \theta d\theta}{11^2 \sec^2 \theta}$$

$$\frac{1}{11} \int d\theta$$

$$\frac{1}{11} \theta + c$$

$$x = 11 \tan \theta$$