

ABIODUN ROLAT INUMIDUN

19/MH/501/009

MBBS

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

Solution

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

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

To find A, $x=1$

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

$$11-3 = 4A$$

$$8 = 4A$$

$$8/4 = 4A/4 \therefore A = 2$$

To find B, $x=-3$

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

$$11+9 = -4B$$

$$20 = -4B$$

$$20/-4 = -4B/-4$$

$$\therefore B = -5$$

$$B = -5$$

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

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

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

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

Solution

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

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

To get A, $x = -1$

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

$$-4-6 = A(-4)$$

$$-10 = -4A$$

$$\frac{-10}{-4} = \frac{-4A}{-4}$$

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

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

To get B, $x = 3$

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

$$12 - 6 = 4B$$

$$6 = 4B$$

$$\frac{6}{4} = \frac{4B}{4}$$

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

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

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

$$\int \frac{4x-6}{x^2-2x-3} = \frac{5}{2x+2} + \frac{3}{2x-6}$$

$$\int \frac{4x-6}{x^2-2x-3} = 5 \ln(2x+2) + 3 \ln(2x-6) + C$$

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

Solution

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

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

To get A, $x = -1$

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

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

To get A, $x = -1$

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

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

$$-24 = -6A$$

$$\frac{-24}{-6} = \frac{-6A}{-6}$$

$$A = 4$$

To get B, $x = 2$

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

$$2(4) - 18 - 35 = B(3)(5)$$

$$8 - 18 - 35 = 15B$$

$$-45 = 15B$$

$$-3 = B$$

$$\therefore B = -3$$

Divide both sides by 15

Celebrating **God's**
Faithfulness



BIRTHDAY
CEREMONY

To get C , $x = -3$

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

$$\cancel{8} / 18 - 35 = 15B \quad 18 + 27 - 35 = C(-2)(-5)$$

~~-45~~

$$\frac{10}{10} = \frac{10C}{10}$$

$$C = 1$$

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

$$4 \ln|x+1| - 3 \ln|x-2| + \ln|x+3|$$

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