NAME: EKANEM ENOABASI NKEREUWEM

COURSE: MAT 104

DEPARTMENT: MBBS

MATRIC NUMBER: 19/MHS01/146

DATE: 2nd MARCH 2020

ANSWER TO ASSIGNMENT III

1. $\int (11-3x)/(x^2+2x-3)\,dx$

Solution

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

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

For A, $x=1$

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

$$8 = 4A$$

$$\therefore A = 2$$

For B, $x=-3$

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

$$20 = -4B$$

$$\therefore B = -5$$

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

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

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

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

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

solution

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

19/MHS01/146

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

At A, $x = -1$

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

$-10 = -4A$

$A = 5/2$

At B, $x = 3$

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

$6 = 4B$

$B = \frac{6}{4} = \frac{3}{2}$

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

$$\Rightarrow \frac{5}{2}\ln(x+1) + 3/2 \ln(x-3) + C$$

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

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

Solution

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

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

At A, $x = -1$

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

$2 + 9 - 35 = -6A$

$-24 = -6A$

$A = 4$

19/m4150 2/146

At B, $x = 2$

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

$8 - 18 - 35 = 15B$

$-45 = -15B$

$B = -3$

At C, $x = -3$

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

$18 + 27 - 35 = C(-2)(-5)$

$10 = 10C$

$C = 1$

$$\therefore \int \frac{5x^2 - 9x - 35}{(x+1)(x-2)(x+3)}\,dx = \int \frac{4}{x+1}\,dx - \int \frac{3}{x-2}\,dx + \int \frac{1}{x+3}\,dx$$

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

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