

03/05/2020

NAME: OTEMIKE OGORCHUKWU CLARA

MATRIC NUMBER: 19/MHSD01/376

SERIAL NUMBER: 168

JAMB REG NUMBER: 95505326AD

DEPARTMENT: MBBS

COLLEGE OF MEDICINE AND HEALTH SCIENCES

COURSE CODE: MAT 104.

Assignment II

$$\begin{aligned} \textcircled{1} \int \frac{11-3x}{x^2+2x-3} dx &= \int \frac{11-3x}{(x+3)(x-1)} dx \\ &= \frac{A}{x+3} + \frac{B}{x-1} \\ &= \frac{A(x-1) + B(x+3)}{(x+3)(x-1)} = \frac{11-3x}{(x+3)(x-1)} \end{aligned}$$

$$\text{At } x = -3; f(-3) \Rightarrow 11 - 3(-3) = A(-3-1) + B(-3+3)$$

$$20 = A(-4)$$

$$20 = -4A$$

$$A = 20/4 = 5$$

$$A = 5$$

$$\text{At } x = 1; f(1) \Rightarrow 11 - 3(1) = A(1-1) + B(1+3)$$

$$8 = 4B$$

$$B = 8/4 = 2$$

$$B = 2$$

$$\frac{11-3x}{(x+3)(x-1)} = \frac{-5}{x+3} + \frac{2}{x-1}$$

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

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

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

where c is the constant of the integration.

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

$$\begin{aligned} \textcircled{2} \int \frac{4x-16}{x^2-2x-3} dx &= \int \frac{4x-16}{(x-3)(x+1)} \\ &= \frac{A}{x-3} + \frac{B}{x+1} \\ &= \frac{A(x+1) + B(x-3)}{(x-3)(x+1)} = \frac{4x-16}{(x-3)(x+1)} \end{aligned}$$

$$\text{At } x=3; f(3) \Rightarrow 4(3)-16 = A(3+1) + B(3-3)$$

$$12-16 = 4A$$

$$-4 = 4A$$

$$A = -4/4 = -1$$

$$A = -1$$

$$\text{At } x=-1; f(-1) \Rightarrow 4(-1)-16 = A(-1+1) + B(-1-3)$$

$$-4-16 = -4B$$

$$-20 = -4B$$

$$B = 20/4 = 5$$

$$B = 5$$

$$\frac{4x-16}{(x-3)(x+1)} = \frac{-1}{x-3} + \frac{5}{x+1}$$

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

$$\int \frac{4x-16}{x^2-2x-3} dx = -1 \ln(x-3) + 5 \ln(x+1) + c$$

where c is the constant of the integration,

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

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

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

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

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

$$2x^2 - 9x - 35 = Ax + 3A + Bx^2 - Bx - 2B + Cx + C$$

$$2x^2 - 9x - 35 = Ax - Bx + Cx + 3A - 2B + C + Bx^2$$

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

$$A - B + C = -9 \quad \text{--- (1)}$$

$$3A - 2B + C = -35 \quad \text{--- (2)}$$

$$B = 2 \quad \text{--- (3)}$$

put (3) into (1) and (2)

$$A - 2 + C = -9$$

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

$$A + C = -9 + 2$$

$$3A + C = -35 + 4$$

$$A + C = -7$$

$$3A + C = -31$$

$$-2A = 24$$

$$A = 24 / -2 = -12$$

Also $A + C = -7$

$$-12 + C = -7$$

$$C = -7 + 12$$

$$C = 5$$

$$\int \frac{2x^2 - 9x - 35}{(x-1)(x-2)(x+3)} dx = \int \frac{-12}{(x+1)} dx + \int \frac{2}{(x-2)} dx + \int \frac{5}{x+3} dx$$

$$\int \frac{2x^2 - 9x - 35}{(x-1)(x-2)(x+3)} = -12 \ln(x+1) + 2 \ln(x-2) + 5 \ln(x+3)$$

where c is the constant of the expression.