

NAME: PHILIP-UBODAGA O. VANESSA

MATRIC NO: 19/MHS01/384

DEPARTMENT: MIBBS

COLLEGE: MHS

COURSE CODE: MAT 104

$$10 \int \frac{11-3x}{(x^2+2x-3)} dx$$

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

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

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

$$f(1) \Rightarrow 11-3(1) = A(1+3) + B(1-1)$$

$$11-3 = 4A$$

$$8 = 4A$$

$$\therefore A = 2$$

$$f(-3) \Rightarrow 11-3(-3) = A(-3+3) + B(-3-1)$$

$$11+9 = -4B$$

$$20 = -4B$$

$$\therefore B = -5$$

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

$$\text{let } u = x-1, \frac{du}{dx} = 1$$

$$\int \frac{2}{u} \cdot \frac{du}{1} = 2 \int \frac{1}{u} du = 2 \ln u = 2 \ln(x-1)$$

$$\text{let } u = x+3, \frac{du}{dx} = 1$$

$$\int \frac{-5}{u} \cdot \frac{du}{1} = -5 \int \frac{1}{u} du = -5 \ln u = -5 \ln(x+3)$$

$$\therefore \underline{2 \ln(x-1) - 5 \ln(x+3) + K}$$

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

$$\frac{4x-16}{x^2-2x-3} = \frac{4x-16}{(x+1)(x-3)}$$

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

$$4x-16 = A(x-3) + B(x+1)$$

$$f(3) \Rightarrow 4(3)-16 = A(3-3) + B(3+1)$$
$$12-16 = 4B$$
$$-4 = 4B$$
$$\therefore B = -1$$

$$f(-1) \Rightarrow 4(-1)-16 = A(-1-3) + B(-1+1)$$
$$-4-16 = -4A$$
$$-20 = -4A$$
$$A = 5$$

Ans # 16

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

$$\text{let } u = x+1, \frac{du}{dx} = 1$$

$$\int \frac{5}{u} \cdot \frac{du}{1} = 5 \int \frac{1}{u} du = 5 \ln u \\ = 5 \ln(x+1)$$

$$\text{let } u = x-3, \frac{du}{dx} = 1$$

$$\int \frac{-1}{u} \cdot \frac{du}{1} = -1 \int \frac{1}{u} du = -1 \ln u \\ = -1 \ln(x-3)$$

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

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

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

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

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

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

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

$$-24 = -6A$$

$$A = 4$$

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

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

$$-45 = 15B$$

$$B = -3$$

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

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

$$10 = 10C$$

$$\therefore C = 1$$

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

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

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