

c.d.4
sec.4

15/10

Mat low Assignment

Franchisee Eureka
19/10/2018 / 16x
MR. PS.

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

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

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

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

let $x = 1$

$$f(1) \Rightarrow 11-3(1) = A(1+3) + B(1-1)$$
$$8 = 4A$$
$$A = 2$$

let $x = -3$

$$f(-3) \Rightarrow 11-3(-3) = A(-3+3) + B(-3-1)$$
$$11+9 = A(0) + B(-4)$$
$$20 = -4B$$
$$B = -5$$

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

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

$$\textcircled{1} - \int \frac{2}{x-1} dx \Rightarrow \text{let } u = x-1$$

$$\frac{du}{dx} = 1$$

sub into the eqn $du = dx$

$$2 \int \frac{1}{u} du = 2 \ln|u| = 2 \ln|x-1| + C$$

$$\int \frac{5}{x+3} dx \text{ --- eqn (ii)}$$

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

$$du = dx$$

Sub into eqn (ii)

$$5 \int \frac{1}{u} du = 5 \ln|u| = 5 \ln|x+3| + C$$

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

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

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

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

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

$$\text{let } x = 3$$

$$\Rightarrow 4(3) - 16 = A(3+1) + B(0)$$

$$12 - 16 = 4A$$

$$-4 = 4A$$

$$A = -1$$

$$\text{let } x = -1$$

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

$$-4 - 16 = A(0) - 4B$$

$$-20 = -4B$$

$$B = 5$$

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

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

$$\int \frac{5}{x+1} dx \quad , \quad \text{let } u = x+1$$

$$\frac{du}{dx} = 1 \quad , \quad du = dx$$

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

$$\int \frac{1}{x-3} dx = \ln(x-3)$$

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

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

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

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

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

$$\text{let } x = -1$$

$$f(-1) \Rightarrow 2(-1)^2 - 9(-1) - 35 = A(-1-2)(-1+3) + B(0) + C(0)$$

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

$$-6A = -24$$

$$A = 4$$

$$\text{let } x = 2$$

$$f(2) \Rightarrow 2(2)^2 - 9(2) - 35 = A(0) + B(2+1)(2+3) + C(0)$$

$$8 - 18 - 35 = B(3)(5)$$

$$15B = -45$$

$$B = -3$$

$$\text{let } x = -3$$

$$f(-3) \Rightarrow 2(-3)^2 - 9(-3) - 35 = A(0) + B(0) + C(-3+1)(-3-2)$$

$$2(9) + 27 - 35 = C(-2)(-5)$$

$$10C = 10$$

$$C = 1$$

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

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

$$\int \frac{4}{x+1} dx \quad \text{let } u = x+1$$

$$\frac{du}{dx} = 1, \quad du = dx$$

$$4 \int \frac{1}{u} du = 4 \ln u = 4 \ln(x+1) + C$$

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

$$\int \frac{1}{x+3} = \ln(x+3) + C$$

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

$$(-3+1)(-3-2)$$