

ASSIGNMENT

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

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

$f(-3)$

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

$$11-3(-3) = -4A$$

$$11+9 = -4A$$

$$20 = -4A$$

$$A = -5$$

$f(1)$

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

$$8 = 4B$$

$$B = 2$$

$$\therefore \int \frac{11-3x}{x^2+2x-3} \Rightarrow \int \left\{ \frac{-5 dx}{x+3} + \frac{2 dx}{x-1} \right\}$$

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

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

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

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

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

19/M/1501/314

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

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

$$\text{if } x+1=0$$

$$x = -1$$

f(-1)

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

$$-24 = -6A$$

$$A = 4$$

f(0)

$$2(0)^2 - 9(0) - 35 = A(0-2)(0+3) + (B(0)+C)(0+3)$$

$$-35 = -24 + C$$

$$C = -11$$

f(1)

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

$$-42 = -4 + -16 + 2B - 22$$

$$-42 = -22 + 2B \Rightarrow -20 = 2B \Rightarrow B = -10$$

$$-4 = 2B \Rightarrow B = -2$$

$$\therefore \int \frac{2x^2 - 9x - 35}{(x+1)(x-2)(x+3)} dx \Rightarrow \int \left[ \frac{4}{x+1} - \frac{2}{x-2} - \frac{11}{x+3} \right] dx$$

$$u = x+1, \quad du/dx = 1, \quad dx = du$$

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

$$u = x-2, \quad du/dx = 1, \quad dx = du$$

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

19/m+1501/314

No 3 Continuation.

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

$$\Rightarrow \int \frac{-11}{u} du \Rightarrow -11 \int \frac{1}{u} du \Rightarrow -11 \ln u \Rightarrow -11 \ln(x+3)$$

$$\int \frac{2x^2 - 9x - 35}{(x+1)(x-2)(x+3)} = 4 \ln|x+1| - 2 \ln|x-2| - 11 \ln|x+3| + C$$

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$$\int \frac{4x-16}{x^2-2x-3} \Rightarrow \int \frac{4x-16}{(x-3)(x+1)} \Rightarrow \int \frac{A}{x-3} + \frac{B}{x+1}$$

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

$$f(3)$$

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

$$12-16 = 4A$$

$$-4 = 4A$$

$$A = -1$$

$$f(-1)$$

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

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

$$-20 = -4B$$

$$B = 5$$

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

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

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

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

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

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