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MBSB

19/MAS01/418

100 level

MATH104 assignment

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

using partial fraction method

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

multiply through by $(x+3)(x-1)$

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

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

$$11-3 = 4B$$

$$8 = 4B$$

$$B = \frac{8}{4}$$

$$B = 2$$

$$f(-3) = 11-3(-3) = A(-3-1)$$

$$= 11+9 = -4A$$

$$20 = -4A$$

$$A = \frac{20}{-4}$$

$$-4$$

$$A = -5$$

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

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

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

using partial fraction method.

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

multiply both sides by $(x-3)(x+1)$

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

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

$$-4 = 4A$$

$$A = \frac{-4}{4}$$

$$A = -1$$

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

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

$$-20 = -4B$$

$$B = \frac{-20}{-4}$$

$$B = 5$$

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

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

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

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

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

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

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

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

$$15B = -45$$

$$B = \frac{-45}{15}$$

$$B = -3$$

$$B = -3$$

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

$$18 + 27 - 35 = C(-2)(-1)$$

$$10 = +10C$$

$$C = \frac{10}{10}$$

$$C = 1$$

$$C = 1$$

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

$$-35 = -6A + 3(-3) + 2(1)$$

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

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

$$-24 = -6A$$

$$A = \frac{-24}{-6}$$

$$A = 4$$

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

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

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