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 DEPARTMENT: MEDICINE AND SURGERY  
 MATRIC NO: 19/MHSD1/400  
 COURSE: MDAT 104.

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

Solution.

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

Take L.C.M.

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

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

$$f(-3) = 20 = -4B$$

$$B = -5$$

$$f(1) = 8 = 4A$$

$$A = 2.$$

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

Integrate with respect to  $x$

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

$$\text{Let } u = x-1; \frac{du}{dx} = 1.$$

$$dx = du.$$

$$\frac{2}{u} \cdot du = 2 \ln u$$

$$= 2 \ln(x-1)$$

$$\text{Let } u = x+3; \frac{du}{dx} = 1.$$

$$dx = du$$

$$\frac{-5}{u} \cdot du = -5 \ln u$$

$$= -5 \ln(x+3).$$

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



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

Solution

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

Take L.C.M.

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

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

$$f(3) = -4 = 4B$$

$$B = -1$$

$$f(-1) = -20 = -4A$$

$$A = 5$$

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

Integrate with respect to  $x$ .

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

$$\text{Let } u = x+1; \frac{du}{dx} = 1$$

$$dx = du$$

$$\frac{5}{u} \cdot du = 5 \ln u$$

$$= 5 \ln(x+1)$$

$$\text{Let } u = x-3; \frac{du}{dx} = 1$$

$$dx = du$$

$$\frac{-1}{u} \cdot du = -\ln u$$

$$= -\ln(x-3)$$

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

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



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

Take L.C.M.

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

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

$$f(-1) = -24 = -6A$$

$$A = 4$$

$$f(2) = -45 = 15B$$

$$B = -3$$

$$f(-3) = 10 = 10C$$

$$C = 1$$

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

Integrate with respect to  $x$ .

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

$$\text{Let } u = x+1; \frac{du}{dx} = 1$$

$$dx = du$$

$$\frac{4}{u} \cdot du = 4 \ln u$$

$$= 4 \ln(x+1)$$

$$\text{Let } u = x-2; \frac{du}{dx} = 1$$

$$dx = du$$

$$\frac{-3}{u} \cdot du = -3 \ln u$$

$$= -3 \ln(x-2)$$

$$\text{Let } u = x+3; \frac{du}{dx} = 1$$

$$dx = du$$

$$\frac{1}{u} \cdot du = \ln u$$

$$= \ln(x+3)$$

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