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

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

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

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

$$A = 8/4 = 2$$

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

$$B = 20/-4 = -5$$

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

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

Let  $u = x-1$ ,  $du/dx = 1$ ; let  $u = x+3$ ,  $du/dx = 1$

$$2 \int \frac{1 \cdot du}{u} - 5 \int \frac{1 \cdot du}{u}$$

$$\int \frac{11-3x}{x^2+2x-3} = 2 \ln u - 5 \ln u$$

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

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

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

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

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

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

$$= 5$$

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

$$B = \frac{-4}{4} = -1$$

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

$$= 5 \int \frac{1}{u} \cdot du - \int \frac{1}{v} \cdot dv$$

$$= 5 \ln u - \ln v$$

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

3.

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

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

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

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

$$A = -24$$

$$\frac{-6}{-6} = 4$$

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

$$B = \frac{-45}{15} = -3$$

$$15 = -3$$

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

$$C = 1$$

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

$$= 4 \int \frac{1}{u} \cdot du - 3 \int \frac{1}{v} \cdot dv + \int \frac{1}{w} \cdot dx$$

$$= 4 \ln u - 3 \ln v + \ln w$$

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