

$$Ax + A + Bx - 3B = 4x - 6$$

$$A + B = 4$$

$$A - 3B = 6$$

$$-4B = 12 \quad \therefore A = 1$$

$$B = -3$$

$$\int \frac{1}{x-3} dx \quad \int \frac{-3}{x+1} dx$$

$$u = x-3 \quad v = x+1$$

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

$$du = dx, \quad dv = dx$$

$$\int \frac{du}{u} - 3 \int \frac{dv}{v}$$

$$1 \ln u - 3 \ln v$$

$$= \ln(x-3) - 3 \ln(x+1) + C$$

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

$$\frac{A}{x+1} + \frac{B}{x-2} + \frac{C}{x+3}$$

$$\frac{A}{x+1} + \frac{B}{x-2} + \frac{C}{x+3}$$

multiply by $(x+1)(x-2)(x+3)$

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

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

$$\Rightarrow -45 = B \times 15$$

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$$= -24 = -6A$$

$$A = 4$$

$$f(-3) = 2(-3)^2 + 9(-3) - 35 = 0 + 0 + C(-3+1)$$

$$= 10 = 10C$$

$$C = 1$$

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

$$= 4 \ln|x+1| - 3 \ln|x-2| + \ln|x+3| + C$$

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1)

$$\int \frac{11-3x}{x^2+9x-3}$$

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

Multiply both sides by $(x+1)(x+3)$

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

$$Ax + 3A + Bx - B = -3x - 11$$

$$A + B = -3$$

$$3A - B = -11$$

$$A = 2, B = -5$$

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

$$\therefore u = x-1$$

$$u = x-2$$

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

$$du = dx$$

$$dx = du$$

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

$$2 \ln(u) - 5 \ln(u)$$

$$= 2 \ln(x-1) - 5 \ln(x-2) + C$$

2)

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

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

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

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



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