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

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

$$\text{let } x = -3$$

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

$$-4A = 20$$

$$A = -5$$

$$\text{let } x = 1$$

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

$$4B = 8$$

$$B = 2$$

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

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

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

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

$$dx$$

$$dx$$

$$\int \frac{-5 du}{u} + \int \frac{2 dv}{v}$$

$$-5 \ln u + 2 \ln v$$

$$-5 \ln(x+3) + 2 \ln(x-1)$$

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

$$u = x+1 \quad u = x-2 \quad u = x+3$$

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

$$du = dx \quad du = dx \quad du = dx$$

$$\int \frac{4du}{u} - \int \frac{3du}{u} - \frac{1}{2} \int \frac{11du}{u}$$

$$4 \ln u - 3 \ln u - 1/2 \ln u$$

$$4 \ln(x+1) - 3 \ln(x-2) - 1/2 \ln(x+3)$$

③ $\int \frac{dx}{x^2+11}$

let $x = 11 \tan \theta$

$dx/d\theta = 11 \sec^2 \theta$

$dx = 11 \sec^2 \theta d\theta$

$$x^2 + 11^2 = 11^2 + 11^2 \tan^2 \theta$$

$$= 11^2 (\tan^2 \theta + 1)$$

$$= 11^2 \sec^2 \theta$$

$$\int \frac{dx}{x^2+11} = \frac{11 \sec^2 \theta d\theta}{11^2 \sec^2 \theta}$$

$1/11 \int d\theta$

$1/11 (\theta)$

$1/11 \tan^{-1} x/11 + C$