$-24 = -6A$

$A = 4$

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

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

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

$f(-1)$

$4(-1) - 16 = B(-1-3)$

$-20 = B(-4)$

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

$B = 5$

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

$\int \frac{-1}{x-3}$

$u = x-3, \quad \frac{du}{dx} = 1$

$dx = du$

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

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

$= -1 \ln u$

$\int \frac{5}{x+1}$ $u = x+1, \frac{du}{dx} = 1$

$dx = du$

$\int \frac{5}{u} \cdot du$

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

$= 5 \ln u$

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

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

(3)

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

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

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

let $x = -3$

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

$10 = 10C$

$\therefore C = 1$

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

where $x = 2$

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

$8 - 18 - 35 = B(3)(5)$

$-45 = 15B$

$-3 = B$

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

let $x = 1$

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

$2 + 9 - 35 = A(-3)(2)$

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

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

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

when $x = -3$

$f(-3) \Rightarrow 11 - 3(-3) = B(3-1)$

$\therefore 20 = B(-4)$

where $B = -5$

where $x = 1$

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

$= 11 - 4 = A(4)$

$7 = A(4)$

$\frac{7}{4} = A$

So, $$\int \frac{11-3x}{(x-1)(x+3)} = \int \frac{7/4}{x-1} + \int \frac{-5}{x+3}$$

$$\int \frac{7/4}{x-1}$$

$u = x-1, \; \frac{du}{dx} = 1, \; dx = du$

$$\int \frac{a}{u} \cdot du$$

$$\frac{7}{4}\int \frac{1}{u} \cdot du = \frac{7}{4} \ln U$$

$$\int \frac{-5}{x+3}$$

$u = x+3, \; \frac{du}{dx} = 1 \quad dx = du$

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

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

$= -5 \ln U$

$\Rightarrow \frac{7}{4} \ln(x-1) - 5\ln(x+3)$

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

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

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

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

$f(+3)$

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

$12 - 16 = A(4)$

$-4 = A(4)$

$\therefore A = -1$