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math 104 Assignment

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

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

$A+B = -3$

$-A + 3B = 11$

$4B = 8$

$4B = 8$

$B = 2$

$A = 5$

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

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

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

$4x - 16 = Ax + A + Bx - 3B$

$A + B = 4$

$A - 3B = 16$

$4B = -20$

$B = -5$

$A = 1$

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

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

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

$A(x^2 + x - 6) + B(x^2 + 2x - 3) + C(x^2 - 3x + 2)$

$Ax^2 + Ax - 6A + Bx^2 + 2Bx - 3B + Cx^2 - 3Cx + 2C$

$A + B + C = 2$

$A + 2B - 3C = -9$

$-6A - 3B + 2C = -35$

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$2A + 3B - 2C = -7$

$-6A - 3B + 2C = -35$

$-4A = -42$

$A = 10.95$

$B = -9$

$C = 0.5$

I found B and C using matrix method

$$\frac{10.5}{x-1} - \frac{9}{x-2} + \frac{0.5}{x+3}$$

$$10.5\ln(x-1) - 9\ln(x-2) + 0.5\ln(x+3)$$