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math 104 assignment  
medicine and surgery

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

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

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

$$A+B = -3$$

$$-A+3B = 11$$

$$4B = 8$$

$$B = 2$$

$$A = 5$$

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

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

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

$$A+B = 4$$

$$A-3B = -16$$

$$4B = 20$$

$$B = 5$$

$$A = -1$$

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

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

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

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

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

$$\begin{aligned} A + B + C &= 2 \\ A + 2B - 3C &= -9 \\ -6A - 3B + 2C &= -35 \end{aligned}$$

$$\begin{aligned} 2A + 3B + 2C &= -7 \\ -6A - 3B + 2C &= -35 \\ -4A &= -42 \end{aligned}$$

$$\begin{aligned} A &= 10.5 \\ B &= -9 \\ C &= 0.5 \end{aligned}$$

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

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