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1) $\int \frac{11-3x}{x^2+2x-3}\,dx = \frac{11-3x}{(x+3)(x-1)} = \frac{A}{(x+3)} + \frac{B}{(x-1)}$

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

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

$x-1=0$

$x=1$

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

$f(1) = 8 = 0+4B$, $8=4B$

$B=2$,

$x+3=0$, $x=-3$

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

$f(-3) = 20 = -4A + 0$, $20=-4A$

$A=-5$,

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

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

2) $\int \frac{4x-16}{x^2-2x-3}\,dx = \frac{4x-16}{(x-3)(x+1)} = \frac{A}{(x-3)} + \frac{B}{(x+1)}$

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

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

$x+1=0$, $x=-1$

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

$f(-1) = -20 = 0-4B$, $-20=-4B$

$B=5$,

$x-3=0$, $x=3$

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

$f(3) = -4 = 4A+0$, $-4=4A$

$A = -1$ 4

$$\int \frac{4x-16}{x^2-2x-3}\,dx = \int \frac{5}{(x-3)} - \frac{1}{(x+1)}$$

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

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

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

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

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

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

~~when $(x-2)=0$~~

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

when $x-2=0$, $x=2$ – input to eqn ①

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

$8-18-35 = A(0) + B(15) + C(0)$

$-45 = 15B$, $\frac{-45}{15} = \frac{15B}{15}$

$B = -3$ 4

when $x+3=0$, $x=-3$ – input to eqn ①

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

$18+27-35 = A(0) + B(0) + C[-2x-6]$

$10 = 12C$, $\frac{10}{12} = \frac{12C}{12}$

$C = \frac{5}{6}$ 4

When $x+1=0, x=-1$ --- put into equn (1)

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

$2-9-35 = A(-3\times 2)+B(0)+C(0)$

$-42 = -6A$

$\frac{-6A}{-6} = \frac{-42}{-6}$, $A = 7$,

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

$= \int \frac{7}{x+1} - \frac{3}{(x+2)} + \frac{(\frac{5}{6})}{x+3}$

$= \int \frac{7}{x+1} - \frac{3}{x-2} + \frac{(\frac{5}{6})}{x+3}$

$7\ln(x+1) - 3\ln(x-2) + \frac{5}{6}\ln(x+3)$,