

$$\begin{aligned}\frac{3}{x+2} + \frac{4}{x-3} &= \frac{3(x-3)}{(x+2)(x-3)} + \frac{4(x+2)}{(x+2)(x-3)} = \frac{3x-9}{(x+2)(x-3)} + \frac{4x+8}{(x+2)(x-3)} \\ &= \frac{3x-9+4x+8}{x^2+2x-3x+2-3} = \frac{7x-1}{x^2-x-1}\end{aligned}$$

$$\frac{2}{x-4} + \frac{3}{x-1} = \frac{2(x-1)}{(x-4)(x-1)} + \frac{3(x-4)}{(x-4)(x-1)} = \frac{2x-2+3x-12}{x^2-4x-x+4} = \frac{5x-14}{x^2-5x+4}$$

$$\begin{aligned}\frac{3x-6}{x-1} + \frac{6x-1}{2x+2} &= \frac{3(x-2)2(x+1)}{(x-1)2(x+1)} + \frac{(6x-1)(x-1)}{(x-1)2(x+1)} = 6 * \frac{x^2+x-2x-2}{2*(x-1)^2} + \frac{6x^2-6x-x+1}{2(x-1)^2} \\ &= \frac{6x^2-6x-12}{2(x-1)^2} + \frac{6x^2-7x+1}{2(x-1)^2} = \frac{12x^2-13x-11}{2(x-1)^2}\end{aligned}$$

$$\begin{aligned}\frac{3x-1}{x} - \frac{x-7}{2x-4} &= \frac{(3x-1)(2x-4)}{x(2x-4)} - \frac{(x-7)x}{x(2x-4)} = \frac{(6x^2-12x-2x+4)-(x^2-7x)}{2x(x-2)} \\ &= \frac{6x^2-14x+4-x^2+7x}{2x(x-2)} = \frac{5x^2-7x+4}{2x^2-4x}\end{aligned}$$

$$\frac{x}{5} + \frac{2-3x}{3x-1} = \frac{x(3x-1)}{5(3x-1)} + \frac{(2-3x)5}{5(3x-1)} = \frac{3x^2-3x+10-15x}{15x-5} = \frac{3x^2-18x+10}{15x-5}$$

$$\begin{aligned}\frac{2x+1}{6-x} - \frac{3-2x}{x+6} &= \frac{(2x+1)(x+6) - (6-x)(3-2x)}{(6-x)(6+x)} = \frac{(2x^2+12x+x+6) - (18-12x-3x+4x^2)}{(6-x)^2} \\ &= \frac{2x^2+13x+6-18+15x-4x^2}{(6-x)^2} = \frac{-2x^2+28x+12}{(6-x)^2} = -2 * \frac{x^2-14x-6}{(6-x)^2}\end{aligned}$$

$$\begin{aligned}\frac{3}{(x-2)} + \frac{x+1}{(x+2)} - \frac{x^2+4}{x^2-4} &= \frac{3(x+2)}{(x-2)(x+2)} + \frac{(x+1)(x-2)}{(x-2)(x+2)} - \frac{x^2+4}{x^2-4} \\ &= \frac{3x+6+x^2-2x+x-2-x^2-4}{x^2-4} = \frac{2x}{x^2-4} = 2 * \frac{x}{x^2-4}\end{aligned}$$

$$\begin{aligned}\frac{4}{x^2} - \frac{1-x}{2x} + \frac{x-1}{x+6} &= \frac{4*2x*(x+6)}{x^2*2x*(x+6)} - \frac{(1-x)*x^2*(x+6)}{x^2*2x*(x+6)} + \frac{(x-1)*x^2*2x}{x^2*2x*(x+6)} \\ &= \frac{8x^2+48x - (x^2*(x+6-x^2-6x)) + 2x^4 - 2x^3}{2x^3(x+6)} \\ &= \frac{8x^2+48x-x^3-6x^2+x^4+6x^3+2x^4-2x^3}{2x^4+12x^3} = \frac{3x^4+3x^3+2x^2+48x}{2x^4+12x^3}\end{aligned}$$