

$$\begin{aligned}
 1. \quad & \left( a - \frac{4ab}{a+b} + b \right) : \left( \frac{a}{a+b} - \frac{b}{b-a} - \frac{2ab}{a^2-b^2} \right) = \\
 & = \frac{a(a+b) - 4ab + b(a+b)}{a+b} : \left( \frac{a(a-b) + b(a+b) - 2ab}{(a+b)(a-b)} \right) = \\
 & = \frac{a^2 + ab - 4ab + ab + b^2}{a+b} \cdot \frac{(a+b)(a-b)}{a^2 - ab + ab + b^2 - 2ab} = \\
 & = \frac{(a^2 - 2ab + b^2) \cdot (a-b)}{a^2 - 2ab + b^2} = a-b \quad a \neq \pm b
 \end{aligned}$$

$$\begin{aligned}
 2. \quad & \frac{x}{ax-2a^2} - \frac{2}{x^2+x-2ax-2a} \cdot \left( 1 + \frac{3x+x^2}{3+x} \right) = \\
 & = \frac{x}{a(x-2a)} - \frac{2}{x(x+1)-2a(x+1)} \cdot \left( 1 + \frac{x(3+x)}{3+x} \right) = \\
 & = \frac{x}{a(x-2a)} - \frac{2}{(x+1)(x-2a)} \cdot 1+x = \\
 & = \frac{x}{a(x-2a)} - \frac{2}{x-2a} = \frac{x-2a}{a(x-2a)} = \frac{1}{a} \quad \begin{array}{l} x \neq -1 \\ x \neq -3 \\ a \neq 0 \\ x \neq 2a \end{array}
 \end{aligned}$$

$$\begin{aligned}
 3. \quad & \frac{2a}{a^2-4x^2} + \frac{1}{2x^2+6x-ax-3a} \cdot \left( x + \frac{3x-6}{x-2} \right) = \\
 & = \frac{2a}{(a-2x)(a+2x)} + \frac{1}{2x(x+3)-a(x+3)} \cdot \left( x + \frac{3(x-2)}{x-2} \right) = \\
 & = \frac{2a}{(a-2x)(a+2x)} + \frac{1}{(x+3)(2x-a)} \cdot x+3 = \frac{2a - a+2x}{(a-2x)(a+2x)} = \\
 & = \frac{a+2x}{(a-2x)(a+2x)} = \frac{1}{a-2x} \quad \begin{array}{l} x \neq 2 \\ x \neq -3 \\ x \neq \pm \frac{a}{2} \end{array}
 \end{aligned}$$