

$$\begin{aligned}
 6. & \left(\frac{m^2+m^2}{m^2-m^2} - \frac{m^2-m^2}{m^2+m^2} \right) : \left(\frac{m+m}{m-m} - \frac{m-m}{m+m} \right) = \\
 & = \frac{(m^2+m^2)^2 - (m^2-m^2)^2}{(m^2-m^2)(m^2+m^2)} : \frac{(m+m)^2 - (m-m)^2}{(m-m)(m+m)} = \\
 & = \frac{(m^2+m^2)^2 - (m^2-m^2)^2}{(m^2-m^2)(m^2+m^2)} \cdot \frac{m^2-m^2}{(m+m)^2 - (m-m)^2} = \\
 & = \frac{m^4 + 2m^2m^2 + m^4 - m^4 + 2m^2m^2 - m^4}{m^2+m^2} \cdot \frac{1}{m^2+2mn+m^2 - m^2+2mn-m^2} = \\
 & = \frac{4m^2m^2}{m^2+m^2} \cdot \frac{1}{4mn} = \frac{mn}{m^2+m^2}
 \end{aligned}$$

$$\begin{aligned}
 4. & 6a + \left(\frac{a}{a-2} - \frac{a}{a+2} \right) : \frac{4a}{a^4 - 2a^3 + 8a - 16} = \\
 & = 6a + \left(\frac{a(a+2) - a(a-2)}{(a-2)(a+2)} \right) : \frac{4a}{a^3(a-2) + 8(a-2)} = \\
 & = 6a + \frac{a^2+2a - a^2+2a}{(a-2)(a+2)} \cdot \frac{(a-2)(a^3+8)}{4a} = \\
 & = 6a + \frac{4a}{(a-2)(a+2)} \cdot \frac{(a-2)(a^3+8)}{4a} = \\
 & = \frac{6a(a+2) + (a^3+8)}{a+2} = \frac{6a(a+2) + (a+2)(a^2-2a+4)}{a+2} = \\
 & = \frac{(a+2)(6a + a^2 - 2a + 4)}{a+2} = a^2 + 4a + 4 = (a+2)^2
 \end{aligned}$$

$$a \neq 0$$

$$a \neq \pm 2$$