

$$\begin{aligned}
 19. \quad & \frac{a^4 - b^4}{a^2 b^2} : \left[\left(1 + \frac{b^2}{a^2}\right) \cdot \left(1 - \frac{2a}{b} + \frac{a^2}{b^2}\right) \right] = \\
 & = \frac{a^4 - b^4}{a^2 b^2} : \left[\frac{a^2 + b^2}{a^2} \cdot \frac{b^2 - 2ab + a^2}{b^2} \right] = \\
 & = \frac{a^4 - b^4}{a^2 b^2} : \frac{(a^2 + b^2) \cdot (b - a)^2}{a^2 b^2} = \frac{(a^2 - b^2)(a^2 + b^2)}{a^2 b^2} \cdot \frac{a^2 / b^2}{(a^2 + b^2) / (b - a)^2} = \\
 & = \frac{(a - b)(a + b)}{(a - b)^2} = \frac{a + b}{a - b} \quad \begin{array}{l} a \neq 0 \\ b \neq 0 \\ a \neq b \end{array}
 \end{aligned}$$

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