

$$\begin{aligned} \text{d)} \quad & \frac{5x}{x^2-6x+9} - \frac{4}{x-3} + \frac{1}{x^2+3x} = \frac{5x}{\underline{(x-3)^2}} + \frac{-4}{\underline{(x-3)}} + \frac{1}{\underline{x(x+3)}} = \\ & \text{"1)": } x \in \mathbb{R} \setminus \left\{ 3, -3, 0 \right\} \\ & \frac{5x \cdot x(x+3)}{\underline{x(x-3)(x-3)} \cdot \underline{x(x+3)}} + \frac{-4 \cdot x(x+3)(x-3)}{\underline{x(x-3)(x-3)} \cdot \underline{x(x+3)}} + \frac{1 \cdot (x-3)(x-3)}{\underline{x(x-3)(x-3)} \cdot \underline{x(x+3)}} \\ & \frac{5x \cdot x \cdot (x+3) - 4x(x+3)(x-3) + 1 \cdot (x-3)(x-3)}{x(x-3)(x-3)(x+3)} = \\ & \frac{5x^2(x+3) - 4x(x^2-9) + (x-3)^2}{x(x-3)^2(x+3)} = \\ & \frac{5x^3 + 15x^2 - 4x^3 + 36x + x^2 - 6x + 9}{x(x-3)^2(x+3)} = \\ & \frac{x^3 + 16x^2 + 30x + 9}{x(x-3)^2(x+3)} \end{aligned}$$

$$\frac{(x-1)(x+5)}{(x-2)(x+2)} \cdot \frac{(x+2)^2}{(x+3)^2}$$

$$\frac{(x-1)(x+2)}{(x-2)(x+3)^2}$$

$$\frac{(x-1)(x+2)}{(x-2)(x+3)} = \frac{x^2+x-2}{x^2+x-6}$$

$$\frac{x^2+2x-3}{x^2-4} \cdot \frac{x^2+4x+4}{x^2+6x+9}$$

$$\frac{5x^2+7x+2}{x^2+2x+1} \cdot \frac{3x^2+2x-1}{25x^2-4}$$

$$\frac{2x^2+9x-5}{5x^2+3x-2} \cdot \frac{x^2+4x+3}{2x^2+5x-3}$$

$$\mathbb{Q} : x \in \mathbb{R} \setminus \{-1, -3, 2\}$$

$$\begin{aligned} f) \quad & \frac{7x^2 + 13x - 2}{3x^2 - 19x + 20} : \frac{7x^2 + 6x - 1}{2x^2 - 7x - 15} = \frac{\cancel{7(x-\frac{1}{2})(x+2)} \cdot \cancel{2(x-\frac{1}{2})(x+\frac{5}{2})}}{\cancel{3(x-5)(x-\frac{2}{3})} \cdot \cancel{4(x+4)(x-\frac{1}{4})}} = \dots \\ & \quad \quad \quad 19^2 = (10-1)^2 = 100 - 10 + 1 \\ & \Delta L_1 = 6^2 - 4ac = 169 + 8 \cdot 7 = 169 + 56 = 225 = 15^2 \quad \left| \begin{array}{l} \Delta_{H_1} = 3^2 1 - 4 \cdot 1 \cdot 10 = 11 \\ r_1 = \frac{3+11}{2} = 5 \quad (x-5) \\ x_2 = \frac{3-11}{2} = -\frac{4}{2} \quad (x-\frac{1}{2}) \end{array} \right. \\ & x_1 = \frac{-13+15}{14} = \frac{1}{2} \quad (x-\frac{1}{2}) \\ & x_2 = \frac{-13-15}{14} = -\frac{28}{14} = -2 \quad (x+2) \\ & \frac{7x^2 + 6x - 1}{2x^2 - 7x - 15} = \frac{(x+2)(7x-1)}{(x-5)(x+\frac{1}{2})} \quad \rightarrow \quad \mathbb{R} \setminus \left\{ 5; \frac{4}{3}; -1; \frac{1}{2}; \right. \\ & \quad \quad \quad \left. -\frac{1}{2} \right\} \end{aligned}$$

a) $\frac{x^3 + 8x^2 - x - 8}{x^2 + 9x + 8} : \frac{2x^2 - 2}{x + 3}$ b) $\frac{x^3 - 5x^2 + 2x - 10}{x^2 + x - 30} : \frac{x^3 + 2x}{x + 6}$