

TBM 8E, 26.4.2017

①

$$\frac{2x-2}{15x} \cdot \frac{3x^2-3x-6}{x^2+x-6} = \frac{2(x-1)}{15x} \cdot \frac{3(x+1)(x-2)}{(x+3)(x-2)} = \frac{2(x-1)(x-1)}{5x(x+3)}$$
$$= \underline{\underline{1}}$$

②

$$\left(1 + \frac{1}{x}\right) \left(1 - \frac{1}{x+1}\right)^{-1}$$
$$= \left(\frac{x+1}{x}\right) \left(\frac{x+1}{x+1} - \frac{1}{x+1}\right)^{-1}$$
$$= \left(\frac{x+1}{x}\right) \left(\frac{x+1-1}{x+1}\right)^{-1} = \left(\frac{x+1}{x}\right) \left(\frac{x+1}{x}\right) = \underline{\underline{\frac{(x+1)^2}{x^2}}}$$

③

$$\frac{x}{x-5} - \frac{5}{x+3} - \frac{40}{x^2-2x-15}$$
$$= \frac{x}{x-5} - \frac{5}{x+3} - \frac{40}{(x-5)(x+3)}$$
$$= \frac{x(x+3) - 5(x-5) - 40}{(x-5)(x+3)}$$
$$= \frac{x^2+3x-5x+25-40}{(x-5)(x+3)} = \frac{x^2-2x-15}{(x-5)(x+3)}$$
$$= \frac{(x-5)(x+3)}{(x-5)(x+3)} = \underline{\underline{1}}$$

L

$$\begin{aligned}
 \textcircled{4} \quad \frac{(\sqrt{x})^3 \cdot \frac{1}{\sqrt[4]{x}}}{\sqrt[8]{x} \cdot \sqrt{x}} &= \frac{x^{\frac{3}{2}} \cdot x^{-\frac{1}{4}}}{x^{\frac{1}{8}} \cdot x^{\frac{1}{2}}} \\
 &= x \cdot x^{-\frac{1}{4}} \cdot x^{-\frac{1}{8}} = x^{1 - \frac{1}{4} - \frac{1}{8}} = x^{\frac{8}{8} - \frac{2}{8} - \frac{1}{8}} \\
 &= x^{\frac{5}{8}} = \underline{\underline{\sqrt[8]{x^5}}}
 \end{aligned}$$

$$\textcircled{5} \quad \frac{x}{2x+3} = \frac{x-3}{2x-1} \quad \begin{array}{l} 2x+3=0 \\ 2x=-3 \\ x=-\frac{3}{2} \end{array} \quad \begin{array}{l} 2x-1=0 \\ 2x=1 \\ x=\frac{1}{2} \end{array}$$

$$\mathbb{D} = \mathbb{R} \setminus \left\{ -\frac{3}{2}, \frac{1}{2} \right\}$$

$$\frac{x}{2x+3} = \frac{x-3}{2x-1} \quad | \cdot (2x+3)(2x-1)$$

$$x(2x-1) = (x-3)(2x+3)$$

$$2x^2 - x = 2x^2 - 3x - 9 \quad | -2x^2 + 3x$$

$$2x = -9$$

$$\underline{\underline{x = -\frac{9}{2}}}$$

$$\mathbb{L} = \left\{ -\frac{9}{2} \right\}$$

$$\textcircled{6} \quad \frac{5}{x^2-9} - \frac{3}{x^2-6x+9} = 0$$

$$\frac{5}{(x+3)(x-3)} - \frac{3}{(x-3)^2} = 0 \quad \mathbb{D} = \mathbb{R} \setminus \{\pm 3\}$$

$$5(x-3) - 3(x+3) = 0$$

$$5x - 15 - 3x - 9 = 0$$

$$2x = 24$$

$$\underline{\underline{x = 12}}$$

$$\cdot (x+3)(x-3)^2$$

$$\mathbb{L} = \{12\}$$

$$\textcircled{7} \quad \frac{x}{x^2-6x+9} - \frac{1}{x^2-3x} = \frac{1}{x} \quad \mathbb{D} = \mathbb{R} \setminus \{0, 3\}$$

$$\frac{x}{(x-3)^2} - \frac{1}{x(x-3)} = \frac{1}{x} \quad \cdot x(x-3)^2$$

$$x^2 - 1 \cdot (x-3) = (x-3)^2$$

$$x^2 - x + 3 = x^2 - 6x + 9 \quad \cdot -x^2 + 6x - 3$$

$$5x = 6$$

$$\underline{\underline{x = \frac{6}{5}}}$$

$$\mathbb{L} = \left\{ \frac{6}{5} \right\}$$



8

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

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

$$D = \mathbb{R} \setminus \{3\}$$
$$/ \cdot 6(x-3)$$

$$(x+3)(x-3) + 3(x+1) = 6(x-1)$$

$$x^2 - 9 + 3x + 3 = 6x - 6 \quad / -6x + 6$$

$$x^2 - 3x = 0$$

$$x(x-3) = 0$$



$$x_1 = 0$$

$$x_2 = 3$$

$$L = \{0, \cancel{3}\}$$

