

$$(3) \quad h(x) = \frac{6x}{11x+121}$$

$$\hookrightarrow 11x+121=0$$

$$\frac{11x}{11} = \frac{-121}{11}$$

$$x = -11$$

$$D: \mathbb{R} - \{-11\}, \quad \{x \mid x \neq -11\}$$

$$(ii) \quad \frac{3x^3y^3 - 21x^2y^2 + 15xy}{3xy} = \frac{\cancel{3xy}(x^2y^2 - 7xy + 5)}{\cancel{3xy}}$$
$$= x^2y^2 - 7xy + 5$$

$$(9) \quad g(x) = \frac{2-x}{(x-2)(5x-4)}$$

$$\hookrightarrow (x-2)(5x-4) = 0$$

$$\downarrow$$
$$x-2=0$$

$$x=2$$

$$\downarrow$$
$$5x-4=0$$

$$\frac{5x-4}{5} = \frac{0}{5}$$

$$x = \frac{4}{5}$$

$$D: \left\{ x \mid x \neq \frac{4}{5}, 2 \right\}$$

$$\textcircled{13} \quad \frac{x^2 + 8x + 7}{x^3 y^5} \cdot \frac{x^4 y^4}{x^2 + 2x + 1}$$

$$\frac{xxxx \cdot yyyy}{xxx \cdot yyyy}$$

$$= \frac{\cancel{(x+1)}(x+7)}{\cancel{x^3 y^5}} \cdot \frac{\cancel{x^4 y^4}}{\cancel{(x+1)^2}}$$

$$= \frac{x(x+7)}{y(x+1)}$$

$$\textcircled{14} \quad \frac{2x^2 - 6x + 4}{x^2 - 5x + 4} \cdot \frac{x^2 - 6x + 8}{2x^2 - 10x + 12}$$

$$= \frac{2(x^2 - 3x + 2)}{(x-4)(x-1)} \cdot \frac{(x-2)(x-4)}{2(x^2 - 5x + 6)}$$

$$= \frac{\cancel{2} \cancel{(x-1)} \cancel{(x-2)}}{\cancel{(x-4)} \cancel{(x-1)}} \cdot \frac{(x-2) \cancel{(x-4)}}{\cancel{2} \cancel{(x-3)} \cancel{(x-2)}}$$

$$= \frac{x-2}{x-3}$$

(16)

$$\frac{-6+5x-x^2}{x^2-6x+8} \div \frac{x^2-10x+21}{x^2-7x+12} \left| \begin{array}{l} -6+5x-x^2 \\ = -x^2+5x-6 \\ = -(x^2-5x+6) \end{array} \right.$$

$$= \frac{-\cancel{(x-2)}\cancel{(x-3)}}{\cancel{(x-2)}\cancel{(x-4)}} \cdot \frac{(x-3)\cancel{(x-4)}}{\cancel{(x-3)}(x-7)}$$

$$= -\frac{x-3}{x-7}$$

(19)

$$\frac{c}{c-4} \cdot \left(\frac{c+5}{c+5}\right) + \frac{5}{c+5} \left(\frac{c-4}{c-4}\right) - \frac{11c-8}{(c+5)(c-4)}$$

Let  $\frac{1}{LCD} = (c+5)(c-4)$

$$= \frac{c \cdot (c+5)}{(c-4)(c+5)} + \frac{5 \cdot (c-4)}{(c+5)(c-4)} - \frac{11c-8}{(c+5)(c-4)}$$

$$= \frac{c \cdot (c+5) + 5 \cdot (c-4) - (11c-8)}{(c+5)(c-4)}$$

$$= \frac{c^2+5c+5c-20-11c+8}{(c+5)(c-4)}$$

$$= \frac{c^2-c-12}{(c+5)(c-4)} = \frac{\cancel{(c-4)}(c+3)}{(c+5)\cancel{(c-4)}} = \frac{c+3}{c+5}$$

24

$$\frac{16(x^4)^2 - 40(x^4) - 96}{(x^4)^2 - 3(x^4) - 4}$$

$$\cdot \frac{(x^4)^2 - 1^2}{2(x^4)^2 + (x^4) - 3}$$

$$2(x^4)^2 + (x^4) - 3$$

$$\begin{array}{l} -6 = P \\ 1 = S \end{array} \parallel 3, -2$$

$$= \underline{2(x^4)^2 + 3(x^4)} - \underline{2(x^4) - 3}$$

$$= (x^4)(\underline{2x^4 + 3}) - 1(\underline{2x^4 + 3})$$

$$= \underline{(2x^4 + 3)(x^4 - 1)}$$

$$16(x^4)^2 - 40(x^4) - 96$$

$$= 8 \left[ \underline{2(x^4)^2 - 5(x^4) - 12} \right]$$

$$\begin{array}{l} -24 = P \\ -5 = S \end{array} \parallel -8, 3$$

$$= 8 \left[ \underline{2(x^4)^2 - 8(x^4) + 3(x^4) - 12} \right]$$

$$= 8 \left[ \underline{2x^4(x^4 - 4)} + \underline{3(x^4 - 4)} \right]$$

$$= \underline{8(x^4 - 4)(2x^4 + 3)}$$

$$\frac{8 \cancel{(x^4 - 4)} (2x^4 + 3)}{\cancel{(x^4 - 4)} (x^4 + 1)}$$

$$\cdot \frac{\cancel{(x^4 - 1)} \cancel{(x^4 + 1)}}{\cancel{(2x^4 + 3)} \cancel{(x^4 - 1)}} = \textcircled{8}$$

$$\begin{aligned}
 & \textcircled{29} \quad \frac{\left(\frac{1}{y^2} - \frac{11}{xy} - \frac{12}{x^2}\right)}{\left(\frac{1}{y^2} - \frac{13}{xy} + \frac{12}{x^2}\right)} \cdot \frac{x^2 y^2}{x^2 y^2} = \frac{\frac{1}{\cancel{y^2}} \cdot \cancel{x^2} \cdot \cancel{y^2} + \frac{11}{\cancel{xy}} \cdot \cancel{x} \cdot \cancel{y} - \frac{12}{\cancel{x^2}} \cdot \cancel{x} \cdot \cancel{y^2}}{\frac{1}{\cancel{y^2}} \cdot \cancel{x^2} \cdot \cancel{y^2} - \frac{13}{\cancel{xy}} \cdot \cancel{x} \cdot \cancel{y} + \frac{12}{\cancel{x^2}} \cdot \cancel{x} \cdot \cancel{y^2}} \\
 & = \frac{x^2 + 11xy - 12y^2}{x^2 - 13xy + 12y^2} \\
 & = \frac{\cancel{(x-12y)}(x+y)}{\cancel{(x-12y)}(x-y)} = \frac{x+y}{x-y}
 \end{aligned}$$

$$\begin{aligned}
 & \textcircled{31} \quad \frac{\left(\frac{x-11}{x+11} - \frac{x+11}{x-11}\right)}{\left(\frac{x-11}{x+11} + \frac{x+11}{x-11}\right)} \cdot \frac{(x+11)(x-11)}{(x+11)(x-11)} = \frac{\frac{x-11}{\cancel{x+11}} \cdot \cancel{(x+11)}(x-11) - \frac{x+11}{\cancel{x-11}} \cdot \cancel{(x-11)}(x+11)}{\frac{x-11}{\cancel{x+11}} \cdot \cancel{(x+11)}(x-11) + \frac{x+11}{\cancel{x-11}} \cdot \cancel{(x-11)}(x+11)} \\
 & = \frac{(x-11)^2 - (x+11)^2}{(x-11)^2 + (x+11)^2} \\
 & = \frac{(x^2 - 22x + 121) - (x^2 + 22x + 121)}{(x^2 - 22x + 121) + (x^2 + 22x + 121)} \\
 & = \frac{\cancel{x^2} - 22x + 121 - \cancel{x^2} - 22x - 121}{x^2 - 22x + 121 + x^2 + 22x + 121} \\
 & = \frac{-44x}{2x^2 + 242} = \frac{-44x}{2(x^2 + 121)} \\
 & = \frac{-22x}{x^2 + 121}
 \end{aligned}$$