

Question 1

$$(1) \quad \frac{5(1-3x)}{4} = -1$$

$$\Leftrightarrow 1-3x = -\frac{4}{5}$$

$$\Leftrightarrow -3x = -\frac{9}{5}$$

$$\Leftrightarrow x = \frac{3}{5} \quad S = \left\{ \frac{3}{5} \right\}$$

$$(2) \quad \frac{3x}{9x-2} = \frac{1-2x}{-6x-8} \quad \text{C.E. : } x \neq \frac{9}{2} \text{ et } x \neq -\frac{4}{3}$$

$$\Leftrightarrow 3x(-6x-8) = (1-2x)(9x-2)$$

$$\Leftrightarrow \cancel{-18x^2} - 24x = 9x - 2 \cancel{-18x^2} + 4x$$

$$\Leftrightarrow -37x = -2$$

$$\Leftrightarrow x = \frac{2}{37} \quad S = \left\{ \frac{2}{37} \right\}$$

$$(3) \quad 3 - \frac{x-2}{9} - \frac{1}{6} \left(1 + \frac{x+4}{2} \right) = 0$$

$$\Leftrightarrow 3 - \frac{x-2}{9} - \frac{1}{6} - \frac{x+4}{12} = 0$$

$$\Leftrightarrow \frac{108}{36} - \frac{4x-8}{36} - \frac{6}{36} - \frac{3x+12}{36} = 0$$

$$\Leftrightarrow 108 - 4x + 8 - 6 - 3x - 12 = 0$$

$$\Leftrightarrow 98 - 7x = 0$$

$$\Leftrightarrow x = \frac{98}{7} = 14 \quad S = \{14\}$$

Question 2

$$(1) \quad \frac{5a^2 - 45}{a^2 + 3a}$$

$$= \frac{5(a^2 - 9)}{a(a+3)}$$

$$= \frac{5(a-3)(\cancel{a+3})}{a(\cancel{a+3})}$$

$$= \frac{5(a-3)}{a}$$

C.E. : $a \neq 0$ et $a \neq -3$

$$(2) \quad \frac{-15a^2(b-1)c}{12a(b+1)c^2}$$

$$= -\frac{5a(b-1)}{4(b+1)c}$$

C.E. : $a \neq 0$ et $b \neq -1$ et $c \neq 0$

$$(3) \quad \frac{4x^2 - 28x + 49}{-2x + 7}$$

$$= \frac{(2x-7)^2}{-(2x-7)}$$

$$= -\frac{2x-7}{1}$$

$$= -2x + 7$$

C.E. : $x \neq \frac{7}{2}$

Question 3

$$\begin{aligned}
 (1) \quad & \frac{5}{x+3} - \frac{1}{3x} \\
 &= \frac{15x}{3x(x+3)} - \frac{x+3}{3x(x+3)} \\
 &= \frac{15x - x - 3}{3x(x+3)} \\
 &= \frac{14x - 3}{3x(x+3)}
 \end{aligned}$$

$$\begin{aligned}
 (3) \quad & \frac{3a-3}{1-9a^2} : \frac{a^2-1}{(3a-1)(2a+2)} \\
 &= \frac{3(a-1)}{(1-3a)(1+3a)} : \frac{(a-1)(a+1)}{2(3a-1)(a+1)} \\
 &= \frac{3\cancel{(a-1)}}{(1-3a)(1+3a)} \cdot \frac{2(3a-1)\cancel{(a+1)}}{\cancel{(a-1)}\cancel{(a+1)}} \\
 &= \frac{-6\cancel{(1-3a)}}{\cancel{(1-3a)}(1+3a)} \\
 &= \frac{-6}{1+3a}
 \end{aligned}$$

$$(4) \quad \frac{\frac{2a-2b}{ab^2}}{\frac{1}{b} - \frac{2}{a} + \frac{b}{a^2}}$$

$$\begin{aligned}
 (2) \quad & 3 \cdot \frac{\frac{a}{2}}{a^2} - \frac{1}{\frac{4}{a+1}} \\
 &= 3 \cdot \frac{a}{2} \cdot \frac{1}{a^2} - 1 \cdot \frac{a+1}{4} \\
 &= \frac{3}{2a} - \frac{a+1}{4} \\
 &= \frac{6}{4a} - \frac{a^2+a}{4a} \\
 &= \frac{6-a-a^2}{4a}
 \end{aligned}$$

$$\begin{aligned}
 & \frac{2a-2b}{ab^2} \\
 &= \frac{ab^2}{a^2-2ab+b^2} \\
 & \quad \frac{2(a-b)}{a^2b} \\
 &= \frac{ab^2}{(a-b)^2} \\
 & \quad \frac{2\cancel{(a-b)}}{ab^2} \cdot \frac{a^2b}{(a-b)^2} \\
 &= \frac{2a}{b(a-b)}
 \end{aligned}$$

$$\begin{aligned}
 (5) \quad & \frac{x+1}{2x^3-4x^2} + \frac{x-1}{2x^3+4x^2} - \frac{1}{x^2-4} \\
 &= \frac{x+1}{2x^2(x-2)} + \frac{x-1}{2x^2(x+2)} - \frac{1}{(x-2)(x+2)} \\
 &= \frac{(x+1)(x+2) + (x-1)(x-2) - 2x^2}{2x^2(x-2)(x+2)} \\
 &= \frac{x^2+2x+x+2+x^2-2x-x+2-2x^2}{2x^2(x-2)(x+2)} \\
 &= \frac{4}{2x^2(x-2)(x+2)} \\
 &= \frac{2}{x^2(x-2)(x+2)}
 \end{aligned}$$

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