1.

$$\frac{3}{2x+2} = \frac{5}{x+1} - \frac{5}{2}$$

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

$$\frac{3}{2(x+1)} = \frac{10}{2(x+1)} - \frac{5(x+1)}{2(x+1)} \quad | \cdot 2(x+1)$$

$$3 = 10 - 5(x+1)$$

(2)

$$3 = 10 - 5x - 5$$

$$3 = 5 - 5x \quad | + 5x$$

$$5x + 3 = 5 \quad | - 3$$

$$5x = 2 \quad | : 5$$

$$x = \frac{2}{5}$$

2.

$$\frac{x+a}{a} - \frac{x}{a-b} = 1$$

$$\frac{(x+a)(a-b)}{a(a-b)} - \frac{ax}{a(a-b)} = 1 \quad | \cdot a(a-b)$$

$$(x+a)(a-b) - ax = a(a-b)$$

$$\cancel{ax} - bx + \cancel{a^2} - \cancel{ab} - \cancel{ax} = \cancel{a^2} - \cancel{ab}$$

(2)

$$-bx = 0 \quad | + bx$$

$$0 = bx \quad | : b$$

$$0 = x$$

3. $\frac{9x+7}{2} - \left(3x - \frac{x-2}{2}\right) = 0 \quad | \cdot 2$

$9x + 7 - (6x - (x-2)) = 0$

$9x + 7 - (6x - x + 2) = 0$

$9x + 7 - 6x + x - 2 = 0$

$4x + 5 = 0 \quad | -5$

$4x = -5 \quad | : 4$

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

(2)

4. $\frac{2x-5}{7} \geq \frac{x}{9} - \frac{2x-3}{3}$

$\frac{9(2x-5)}{63} \geq \frac{7x}{63} - \frac{21(2x-3)}{63} \quad | \cdot 63$

$9(2x-5) \geq 7x - 21(2x-3)$

$18x - 45 \geq 7x - 42x + 63$

$18x - 45 \geq -35x + 63 \quad | +35x$

$53x - 45 \geq 63 \quad | +45$

$53x \geq 108 \quad | : 53$

$x \geq \frac{108}{53}$

(2)

$\mathbb{L} = \{3, 4, 5, 6, \ldots\}$

5.

$$\frac{5}{x^2+x} < \frac{6}{x^2-x} < \frac{1}{x^2-1} \qquad x \neq 0;+1;-1$$

$$\frac{5}{x(x+1)} < \frac{6}{x(x-1)} < \frac{1}{(x+1)(x-1)}$$

$$\frac{5(x-1)}{x(x+1)(x-1)} < \frac{6(x+1)}{x(x+1)(x-1)} < \frac{x}{x(x+1)(x-1)} \quad \Big| \cdot x(x+1)(x-1)$$

$$5(x-1) < 6(x+1) < x$$

(2)

$5x-5 < 6x+6 \quad |-5x$

$-5 < x+6 \quad |-6$

$-11 < x$

$6x+6 < x \quad |-x$

$5x+6 < 0 \quad |-6$

$5x < -6 \quad |:5$

$x < -\frac{6}{5}$

$\mathbb{L} = \{-2, -3, -4, \ldots, -10\}$

6.

$\frac{5-2x}{3} < 0 \quad |\cdot 3$

$5-2x < 0 \quad |+2x$

$5 < 2x \quad |:2$

$\frac{5}{2} < x$

$\frac{4x-3}{6} < \frac{3x+1}{5} \quad |\cdot 30$

$5(4x-3) < 6(3x+1)$

$20x-15 < 18x+6 \quad |-18x$

$2x-15 < 6 \quad |+15$

$2x < 21 \quad |:2$

$x < \frac{21}{2}$

(2)

$\mathbb{L} = \{3, 4, 5, 6, 7, 8, 9, 10\}$

7.

$$\frac{x}{6x+15} - \frac{1}{4x-10} - \frac{15}{4x^2-25} = \frac{1}{6}$$

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

$$\frac{2x(2x-5)}{6(2x+5)(2x-5)} - \frac{3(2x+5)}{6(2x+5)(2x-5)} - \frac{90}{6(2x+5)(2x-5)} = \frac{(2x+5)(2x-5)}{6(2x+5)(2x-5)} \quad | \cdot HN$$

$$2x(2x-5) - 3(2x+5) - 90 = (2x+5)(2x-5)$$

(2)

$$\cancel{4x^2} - 10x - 6x - 15 - 90 = \cancel{4x^2} - 25$$

$$-16x - 105 = -25 \quad | +16x$$

$$-105 = 16x - 25 \quad | +25$$

$$-80 = 16x \quad | :16$$

$$-5 = x$$

8.

$$\frac{1}{x-2} - \frac{2}{x+3} > 0 \qquad x \neq +2; -3$$

$$\frac{x+3}{(x-2)(x+3)} - \frac{2(x-2)}{(x-2)(x+3)} > 0 \quad | \cdot (x-2)(x+3)$$

$$x+3 - 2(x-2) > 0$$

(2)

$$x+3 - 2x + 4 > 0$$

$$-x + 7 > 0 \quad | +x$$

$$7 > x$$

$$\mathbb{L} = \{6, 5, 4, 3, 1, 0, -1, -2, -4, -5\}$$

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