1. a.) $\frac{x^2+4x+4}{3x-3} \cdot \frac{9-9x}{x^2+5x+6} = \frac{(x+2)\cdot(x+2)}{3\cdot(x-1)} \cdot \frac{\ominus 9\cdot(x-1)}{(x+3)(x+2)} =$

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

b.) $\frac{a+9}{a^2-1} - \frac{a+5}{a^2+a} = \frac{a+9}{(a+1)\cdot(a-1)} - \frac{a+5}{a\cdot(a+1)} =$

$\frac{a\cdot(a+9)}{a\cdot(a+1)(a-1)} - \frac{[(a-1)(a+5)]}{a\cdot(a+1)(a-1)} = \frac{a^2+9a-[a^2+4a-5]}{a\cdot(a+1)(a-1)} =$

$\frac{a^2+9a-a^2-4a+5}{a\cdot(a+1)(a-1)} = \frac{5a+5}{a(a+1)(a-1)} = \frac{5\cdot(a+1)}{a(a+1)(a-1)} = \frac{5}{a(a-1)}$ 1

4

c.) $\frac{s}{st-t^2} + \frac{t}{s^2-st} - \frac{s+t}{st} = \frac{s}{t\cdot(s-t)} + \frac{t}{s\cdot(s-t)} - \frac{s+t}{st} =$

$\frac{s^2}{st\cdot(s-t)} + \frac{t^2}{st(s-t)} - \frac{[(s-t)(s+t)]}{st(s-t)} = \frac{s^2+t^2-[s^2-t^2]}{st\cdot(s-t)} =$

$\frac{s^2+t^2-s^2+t^2}{st\cdot(s-t)} = \frac{2\cdot t}{s(s-t)} = \frac{2\cdot t}{s(s-t)}$ 1

d.) $\left(1-\frac{1}{a}-\frac{2}{a^2}\right) : (a+1) = \left(\frac{1}{1}-\frac{1}{a}-\frac{2}{a^2}\right) : \left(\frac{a+1}{1}\right) =$

$\left(\frac{a^2}{a^2}-\frac{a}{a^2}-\frac{2}{a^2}\right) : \left(\frac{a+1}{1}\right) = \frac{a^2-a-2}{a^2} \cdot \frac{1}{a+1} =$

$\frac{(a-2)\cdot(a+1)}{a^2} \cdot \frac{1}{(a+1)} = \frac{a-2}{a^2}$ 1

---

2 a.) $\frac{9x-1}{x^2-9x+20} > \frac{5}{x-4} - \frac{1}{x-5}$ $\quad x \neq +4; +5$

$\frac{9x-1}{(x-4)\cdot(x-5)} > \frac{5(x-5)}{(x-4)(x-5)} - \frac{1\cdot(x-4)}{(x-4)(x-5)} \quad | \cdot HN$

$9x-1 > 5x-25 - x \oplus 4$

$9x-1 > 4x-21 \quad | -4x | +1$

$5x > -20 \quad | :5$

$x > -4$ 1

$\mathbb{L} = \{-3; -2; -1; 0; 1; 2; 3; 6; 7; \ldots\}$ 1/2

b.) $\frac{x}{2x-12} + \frac{1}{2} = \frac{6}{x-6}$ $\quad x \neq +6$

$\frac{x}{2(x-6)} + \frac{x-6}{2(x-6)} = \frac{12}{2(x-6)}$ $\quad | \cdot HN$

$x + x - 6 = 12$

$2x - 6 = 12 \quad | +6$

$2x = 18 \quad | : 2$

$x = 9$ 1

$\mathbb{L} = \{9\}$ ½

c.) $\frac{5}{x^2-9} - \frac{3}{x^2-6x+9} = 0$ $\quad x \neq +3; -3$

$\frac{5}{(x+3)\cdot(x-3)} - \frac{3}{(x-3)(x-3)} = 0$

(6)

$\frac{5\cdot(x-3)}{(x+3)(x-3)(x-3)} - \frac{3(x+3)}{(x+3)(x-3)(x-3)} = 0 \quad | \cdot HN$

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

$2x - 24 = 0 \quad | +24$

$2x = 24 \quad | : 2$

$x = 12$ 1

$\mathbb{L} = \{12\}$ ½

d.) $\frac{1}{x+2} + \frac{1}{x-1} > \frac{2}{x}$ $\quad x \neq 0; +1; -2$

$\frac{x(x-1)}{x(x+2)(x-1)} + \frac{x(x+2)}{x(x+2)(x-1)} > \frac{2(x+2)(x-1)}{x(x+2)(x-1)} \quad | \cdot HN$

$\cancel{x^2} - x + \cancel{x^2} + 2x > \cancel{2x^2} + 2x - 4$

$x > 2x - 4 \quad | -x | +4$

$4 > x$ 1

$\mathbb{L} = \{3; 2; -1; -3; -4; \dots\}$ ½

10 Pkte