

$$1. \quad \frac{3}{2} \left( x + \frac{1}{2} \right) > 2 \left( x + \frac{1}{2} \right) - \frac{1}{2} \left( x - \frac{1}{2} \right)$$

$$\frac{3}{2}x + \frac{3}{4} > 2x + 1 - \frac{1}{2}x + \frac{1}{4} \quad 0x > \frac{1}{2}$$

*imp.*

$$2. \quad 4(5x - 1) + 2(3x + 1)^2 > 3x(6x + 5) - 2x - 3$$

$$20x - 4 + 2(9x^2 + 1 + 6x) > 18x^2 + 15x - 2x - 3$$

$$20x - 4 + 18x^2 + 2 + 12x > 18x^2 + 15x - 2x - 3 \quad 19x > -1$$

$$x > -\frac{1}{19}$$

$$3. \quad \begin{cases} 9x - 15 - 2(x + 1) \geq -2(x - 3) - 20 \\ \frac{1-x}{2} + 1 \geq \frac{2}{3}x - \frac{4}{3} \end{cases}$$

$$\begin{cases} 9x - 15 - 2x - 2 \geq -2x + 6 - 20 \\ 3 - 3x + 6 \geq 4x - 8 \end{cases}$$

$$\begin{cases} 9x \geq 3 \\ -7x \geq -17 \end{cases} \quad \begin{cases} x \geq \frac{1}{3} \\ x \leq \frac{17}{7} \end{cases}$$

$$\frac{1}{3} \leq x \leq \frac{17}{7}$$

$$4. \quad \begin{cases} 2x + (x - 1)^2 + x > x^2 + 3 \\ 6x - 3 < x + 2 \end{cases}$$

$$\begin{cases} 2x + x^2 - 2x + 1 + x > x^2 + 3 \\ 5x < 5 \end{cases}$$

$$\begin{cases} x > 2 \\ x < 1 \end{cases}$$

*imp.*

$$5. \frac{x+5}{2x-8} + \frac{x-2}{x} \geq \frac{3x+1}{2x} + \frac{x+1}{x(x-4)}$$

$$\frac{x+5}{2(x-4)} + \frac{x-2}{x} - \frac{3x+1}{2x} - \frac{x+1}{x(x-4)} \geq 0$$

$$\frac{x(x+5) + 2(x-2)(x-4) - (x-4)(3x+1) - 2(x+1)}{2x(x-4)} \geq 0$$

$$\frac{x^2 + 5x + 2(x^2 - 6x + 8) - (3x^2 - 11x - 4) - 2x - 2}{2x(x-4)} \geq 0$$

$$\frac{x^2 + 5x + 2x^2 - 12x + 16 - 3x^2 + 11x + 4 - 2x - 2}{2x(x-4)} \geq 0$$

$$\frac{2x+18}{2x(x-4)} \geq 0$$

$$\frac{x+9}{x(x-4)} \geq 0$$

$$N \geq 0: \quad x \geq -9$$

$$D_1 > 0: \quad x > 0$$

$$D_2 > 0: \quad x > 4$$

$$-9 \leq x < 0 \vee x > 4$$

$$6. \frac{x+1}{3x} \leq \frac{x}{3x+1}$$

$$\frac{(x+1)(3x+1) - 3x^2}{3x(3x+1)} \leq 0$$

$$\frac{3x^2 + 4x + 1 - 3x^2}{3x(3x+1)} \leq 0$$

$$\frac{4x+1}{3x(3x+1)} \leq 0$$

$$N \geq 0: \quad x \geq -\frac{1}{4}$$

$$D_1 > 0: \quad x > 0$$

$$D_2 > 0: \quad x > -\frac{1}{3}$$

$$x < -\frac{1}{3} \vee -\frac{1}{4} \leq x < 0$$

7.  $|7x + 1| \geq 0$

$\forall x \in R$

8.  $|3x - 4| < 2$

$$\begin{cases} 3x - 4 < 2 \\ 3x - 4 > -2 \end{cases}$$

$$\begin{cases} 3x < 6 \\ 3x > 2 \end{cases}$$

$$\begin{cases} x < 2 \\ x > \frac{2}{3} \end{cases}$$

$\frac{2}{3} < x < 2$

9.  $\left| \frac{7}{x} - 4x + 7 \right| < 0$

*imp.*