

$$1. \quad \frac{x+4}{2} + \frac{1-2x}{3} \geq \frac{x+3}{2}$$

$$3(x+4) + 2(1-2x) \geq 3(x+3)$$

$$3x+12+2-4x \geq 3x+9$$

$$-4x \geq -5$$

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

$$2. \quad 3 + (x+2)(x-3) \geq (x+1)^2$$

$$3 + x^2 - 3x + 2x - 6 \geq x^2 + 2x + 1$$

$$-3x \geq 4$$

$$x \leq -\frac{4}{3}$$

$$3. \quad (x+1)^2 - x < x(x+1) + 2x - 1$$

$$x^2 + 2x + 1 - x < x^2 + x + 2x - 1$$

$$-2x < -2$$

$$x > 1$$

$$4. \quad \frac{2x-1}{4x} \geq \frac{x-1}{2x+1}$$

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

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

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

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

$$D_1 > 0: 4x > 0 \Rightarrow x > 0$$

$$D_2 > 0: 2x + 1 > 0 \Rightarrow x > -\frac{1}{2}$$

$$-\frac{1}{2} < x < 0 \vee x \geq \frac{1}{4}$$

$$5. \quad \begin{cases} 9 - 2x > 3x - 1 \\ x - 2 > 7 + 4x \end{cases}$$

$$\begin{cases} -5x > -10 \\ -3x > 9 \end{cases} \quad \begin{cases} x < 2 \\ x < -3 \end{cases}$$

$$x < -3$$

$$6. \begin{cases} \frac{1}{6} - \frac{3}{2}x < \frac{1}{2}x + \frac{2}{3} \\ x + \frac{5}{2} < \frac{x}{2} - 2 \end{cases}$$

$$\begin{cases} 1 - 9x < 3x + 4 \\ 2x + 5 < x - 4 \end{cases}$$

$$\begin{cases} 1 - 9x < 3x + 4 \\ 2x + 5 < x - 4 \end{cases}$$

$$\begin{cases} -12x < 3 \\ x < -9 \end{cases} \quad \begin{cases} x > -\frac{1}{4} \\ x < -9 \end{cases}$$

imp.

$$7. |3x + 1| \leq 7$$

$$\begin{cases} 3x + 1 \leq 7 \\ 3x + 1 \geq -7 \end{cases}$$

$$\begin{cases} 3x \leq 6 \\ 3x \geq -8 \end{cases}$$

$$\begin{cases} x \leq 2 \\ x \geq -\frac{8}{3} \end{cases}$$

$$-\frac{8}{3} \leq x \leq 2$$

$$8. |5x + 2| - |x + 3| = 5x$$

$$\begin{array}{c|c|c} -3 & -\frac{2}{5} & \\ \hline -5x - 2 & -5x - 2 & 5x + 2 \\ -x - 3 & x + 3 & x + 3 \end{array}$$

$$\begin{cases} x < -3 \\ -5x - 2 + x + 3 = 5x \end{cases}$$

$$\begin{cases} x < -3 \\ -9x = -1 \end{cases}$$

$$\begin{cases} x < -3 \\ x = \frac{1}{9} \end{cases}$$

imp.

$$\begin{cases} -3 \leq x < -\frac{2}{5} \\ -5x - 2 - x - 3 = 5x \end{cases}$$

$$\begin{cases} -3 \leq x < -\frac{2}{5} \\ -11x = 5 \end{cases}$$

$$\begin{cases} -3 \leq x < -\frac{2}{5} \\ x = -\frac{5}{11} \end{cases}$$

$$x = -\frac{5}{11}$$

$$\begin{cases} x \geq -\frac{2}{5} \\ 5x + 2 - x - 3 = 5x \end{cases}$$

$$\begin{cases} x \geq -\frac{2}{5} \\ -x = 1 \end{cases}$$

$$\begin{cases} x \geq -\frac{2}{5} \\ x = -1 \end{cases}$$

imp.