

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

$$\frac{x}{3} - \frac{1}{2}x - \frac{1}{3} < \frac{1}{3} - 2x - \frac{2}{3}$$

$$2x - 3x - 2 < 2 - 12x - 4$$

$$2x - 3x + 12x < 2 + 2 - 4$$

$$x < 0$$

$$2. \quad \frac{5}{2}x + \frac{2x-2}{3} - \frac{1-x}{3} - \left( \frac{3x+1}{2} + 2x \right) \geq \frac{3}{2}$$

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

$$15x + 4x - 4 - 2 + 2x - 9x - 3 - 12x - 9 \geq 0$$

$$0x \geq 18$$

*imp.*

$$3. \quad \begin{cases} 2x(x-1) - x^2 + x - 3 \leq x(x-2) + 7 \\ 2x+3 - x + x^2 > x(x+2) - 3 \end{cases}$$

$$\begin{cases} 2x^2 - 2x - x^2 + x - 3 - x^2 + 2x - 7 \leq 0 \\ 2x+3 - x + x^2 - x^2 - 2x + 3 > 0 \end{cases}$$

$$\begin{cases} +x \leq 10 \\ -x + 6 > 0 \end{cases}$$

$$\begin{cases} +x \leq 10 \\ x < 6 \end{cases}$$

$$x < 6$$

$$4. \quad \frac{x-1}{x^2+3x} + \frac{2}{x} + \frac{9}{2x+6} \geq 0$$

$$\frac{x-1}{x(x+3)} + \frac{2}{x} + \frac{9}{2(x+3)} \geq 0$$

$$\frac{2x-2+4x+12+9x}{2x(x+3)} \geq 0$$

$$\frac{2(x-1)+4(x+3)+9x}{2x(x+3)} \geq 0$$

$$\frac{15x+10}{2x(x+3)} \geq 0$$

$$N \geq 0: \quad 15x+10 \geq 0 \quad \Rightarrow \quad x \geq -\frac{2}{3}$$

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

$$D_2 > 0: \quad x+3 > 0 \quad \Rightarrow \quad x > -3$$

$$-3 < x \leq -\frac{2}{3} \quad \vee \quad x > 0$$

5.  $|x + 2| - |x - 1| = 2x$

$$\begin{array}{r|l|l} -2 & 1 & \\ \hline -x-2 & x+2 & x+2 \\ -x+1 & -x+1 & x-1 \end{array}$$

$$\begin{cases} x < -2 \\ -x - 2 + x - 1 = 2x \end{cases} \quad \begin{cases} x < -2 \\ x = -\frac{3}{2} \end{cases} \quad \text{imp.}$$

$$\begin{cases} -2 \leq x < 1 \\ x + 2 + x - 1 = 2x \end{cases} \quad \begin{cases} -2 \leq x < 1 \\ 0x = -1 \end{cases} \quad \text{imp.}$$

$$\begin{cases} x \geq 1 \\ x + 2 - x + 1 = 2x \end{cases} \quad \begin{cases} x \geq 1 \\ x = \frac{3}{2} \end{cases} \quad x = \frac{3}{2}$$

6.  $\left| \frac{5+x}{x} \right| < 1$

$$\begin{cases} \frac{5+x}{x} < 1 \\ \frac{5+x}{x} > -1 \end{cases} \quad \begin{cases} \frac{5+x-x}{x} < 0 \\ \frac{5+x+x}{x} > 0 \end{cases} \quad \begin{cases} \frac{5}{x} < 0 \\ \frac{5+2x}{x} > 0 \end{cases}$$

A:  $x < 0$

B:  $N > 0; 5 + 2x > 0 \Rightarrow x > -\frac{5}{2}$

D:  $x > 0$

$$\begin{cases} x < 0 \\ x < -\frac{5}{2} \vee x > 0 \end{cases} \quad x < -\frac{5}{2}$$

7.  $|2x + 7| > 5$

$2x + 7 < -5 \quad \vee \quad 2x + 7 > 5$

$2x < -12 \quad \vee \quad 2x > -2$

$x < -6 \vee x > -1$