

$$\begin{aligned}
 1. \quad & 7(3x - 1)^2 - 5x^3 \geq x^2(63 - 5x) - 7x \\
 & 7(9x^2 - 6x + 1) - 5x^3 \geq 63x^2 - 5x^3 - 7x \\
 & 63x^2 - 42x + 7 - 5x^3 \geq 63x^2 - 5x^3 - 7x \\
 & -35x \geq -7
 \end{aligned}$$

$$x \leq \frac{1}{5}$$

$$\begin{aligned}
 2. \quad & \frac{3x + 1}{5} - \frac{7}{4}x - \frac{1}{10}(2x - 1)(x + 1) \geq \frac{5 - x^2}{5} + \frac{1}{4} \\
 & \frac{12x + 4 - 35x - 2(2x^2 + 2x - x - 1)}{20} \geq \frac{20 - 4x^2 + 5}{20} \\
 & 12x + 4 - 35x - 4x^2 - 4x + 2x + 2 \geq 20 - 4x^2 + 5 \\
 & -25x \geq 19
 \end{aligned}$$

$$x \leq -\frac{19}{25}$$

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

$$\begin{cases} 5x > 9 \\ 3x + 3 < 2x - 10 \\ 8x - 20 - 3x + 12 < 3x \end{cases}$$

$$\begin{cases} x > \frac{9}{5} \\ x < -13 \\ 2x < 8 \end{cases}$$

$$\begin{cases} x > \frac{9}{5} \\ x < -13 \\ x < 4 \end{cases}$$

imp.

$$\begin{aligned}
 4. \quad & \frac{3x + 1}{x} > \frac{6x - 1}{2x + 1} \\
 & \frac{6x^2 + 3x + 2x + 1 - 6x^2 + x}{x(2x + 1)} > 0
 \end{aligned}$$

$$\frac{(3x + 1)(2x + 1) - x(6x - 1)}{x(2x + 1)} > 0$$

$$\frac{6x + 1}{x(2x + 1)} > 0$$

$$N > 0: 6x + 1 > 0 \Rightarrow x > -\frac{1}{6}$$

$$D_1 > 0: x > 0$$

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

$$-\frac{1}{2} < x < -\frac{1}{6} \vee x > 0$$

5. $|3x + 1| + |x - 3| = 4$

$$\begin{array}{r|l|l} -\frac{1}{3} & & 3 \\ \hline -x + 3 & -x + 3 & x - 3 \\ -3x - 1 & 3x + 1 & 3x + 1 \end{array}$$

$$\left\{ \begin{array}{l} x < -\frac{1}{3} \\ -3x - 1 - x + 3 = 4 \end{array} \right. \quad \left\{ \begin{array}{l} x < -\frac{1}{3} \\ -4x = 2 \end{array} \right. \quad \left\{ \begin{array}{l} x < -\frac{1}{3} \\ x = -\frac{1}{2} \end{array} \right. \quad x = -\frac{1}{2}$$

$$\left\{ \begin{array}{l} -\frac{1}{3} \leq x < 3 \\ 3x + 1 - x + 3 = 4 \end{array} \right. \quad \left\{ \begin{array}{l} -\frac{1}{3} \leq x < 3 \\ 2x = 0 \end{array} \right. \quad \left\{ \begin{array}{l} -\frac{1}{3} \leq x < 3 \\ x = 0 \end{array} \right. \quad x = 0$$

$$\left\{ \begin{array}{l} x \geq 3 \\ 3x + 1 + x - 3 = 4 \end{array} \right. \quad \left\{ \begin{array}{l} x \geq 3 \\ 4x = 6 \end{array} \right. \quad \left\{ \begin{array}{l} x \geq 3 \\ x = \frac{3}{2} \end{array} \right. \quad imp.$$

6. $|4x + 1| < 3$

$$\left\{ \begin{array}{l} 4x + 1 < 3 \\ 4x + 1 > -3 \end{array} \right. \quad \left\{ \begin{array}{l} 4x < 2 \\ 4x > -4 \end{array} \right.$$

$$\left\{ \begin{array}{l} x < \frac{1}{2} \\ x > -1 \end{array} \right. \quad -1 < x < \frac{1}{2}$$

7. $|5x + 8| > 3$

$$5x + 8 < -3 \quad \vee \quad 5x + 8 > 3$$

$$5x < -11 \quad \vee \quad 5x > -5 \quad x < -\frac{11}{5} \quad \vee \quad x > -1$$