

Solution ***Section 1.7 – Inequalities***

Exercise

Find: $(-3, 0) \cap [-1, 2]$

Solution

$$(-3, 0) \cap [-1, 2] = \underline{[-1, 0]}$$

Exercise

Find: $(-3, 0) \cup [-1, 2]$

Solution

$$(-3, 0) \cup [-1, 2] = \underline{(-3, 2]}$$

Exercise

Find: $(-4, 0) \cap [-2, 1]$

Solution

$$(-4, 0) \cap [-2, 1] = \underline{[-2, 0]}$$

Exercise

Find: $(-4, 0) \cup [-2, 1]$

Solution

$$(-4, 0) \cup [-2, 1] = \underline{(-4, 1]}$$

Exercise

Find: $(-\infty, 5) \cap [1, 8)$

Solution

$$(-\infty, 5) \cap [1, 8) = \underline{[1, 5]}$$

Exercise

Find: $(-\infty, 5) \cup [1, 8)$

Solution

$$(-\infty, 5) \cup [1, 8) = \underline{(-\infty, 8)}$$

Exercise

Solve $-3x + 5 > -7$

Solution

$$-3x > -7 - 5$$

$$-3x > -12$$

$$\frac{-3}{-3}x < \frac{-12}{-3}$$

$$\therefore \text{Solution: } \underline{x < 4} \quad (-\infty, 4)$$

Exercise

Solve $2 - 3x \leq 5$

Solution

$$-3x \leq 3 \quad \text{Divide by } -3 \text{ both sides}$$

$$\frac{-3}{-3}x \geq \frac{3}{-3}$$

$$\therefore \text{Solution: } \underline{x \geq -1} \quad \text{or } [-1, \infty)$$

Exercise

Solve $4 - 3x \leq 7 + 2x$

Solution

$$4 - 3x - 4 \leq 7 + 2x - 4$$

$$-3x \leq 3 + 2x$$

$$-3x - 2x \leq 3 + 2x - 2x$$

$$-5x \leq 3$$

$$\therefore \text{Solution: } \underline{x \geq -\frac{3}{5}} \quad \text{or } \left[-\frac{3}{5}, \infty\right)$$

Exercise

Solve the inequality equation $5x + 11 < 26$

Solution

$$5x < 15$$

$$\therefore \text{Solution: } \underline{x < 3} \mid \text{ or } (-\infty, 3)$$

Exercise

Solve the inequality equation $3x - 8 \geq 13$

Solution

$$3x \geq 21$$

$$\therefore \text{Solution: } \underline{x \geq 7} \mid \text{ or } [7, \infty)$$

Exercise

Solve the inequality equation $-9x \geq 36$

Solution

$$-\frac{9x}{9} \geq \frac{36}{9}$$

$$-x \geq 4$$

$$\therefore \text{Solution: } \underline{x \leq -4} \mid \text{ or } (-\infty, -4]$$

Exercise

Solve the inequality equation $-4x \leq 64$

Solution

$$-\frac{4x}{4} \leq \frac{64}{4}$$

$$-x \leq 16$$

$$\therefore \text{Solution: } \underline{x \geq -16} \mid \text{ or } [-16, \infty)$$

Exercise

Solve the inequality equation $8x - 11 \leq 3x - 13$

Solution

$$5x \leq -2$$

$$\therefore \text{Solution: } \underline{x \leq -\frac{2}{5}} \quad \text{or} \quad \left(-\infty, -\frac{2}{5}\right]$$

Exercise

Solve the inequality equation $18x + 45 \leq 12x - 8$

Solution

$$6x \leq -53$$

$$\therefore \text{Solution: } \underline{x \leq -\frac{53}{6}} \quad \text{or} \quad \left(-\infty, -\frac{53}{6}\right]$$

Exercise

Solve the inequality equation $4(x + 1) + 2 \geq 3x + 6$

Solution

$$4x + 4 + 2 \geq 3x + 6$$

$$\therefore \text{Solution: } \underline{x \geq 0} \quad \text{or} \quad [0, \infty)$$

Exercise

Solve the inequality equation $8x + 3 > 3(2x + 1) + x + 5$

Solution

$$8x + 3 > 6x + 3 + x + 5$$

$$8x + 3 > 7x + 8$$

$$\therefore \text{Solution: } \underline{x > 5} \quad \text{or} \quad (5, \infty)$$

Exercise

Solve the inequality equation $2x - 11 < -3(x + 2)$

Solution

$$2x - 11 < -3x - 6$$

$$5x < 5$$

$$\therefore \text{Solution: } \underline{x < 1} \quad \text{or} \quad (-\infty, 1)$$

Exercise

Solve the inequality equation $-4(x + 2) > 3x + 20$

Solution

$$-4x - 8 > 3x + 20$$

$$-7x > 28$$

$$-x > 4$$

$$\therefore \text{Solution: } \underline{x < -4} \mid \text{ or } (-\infty, -4)$$

Exercise

Solve the inequality equation $1 - (x + 3) \geq 4 - 2x$

Solution

$$1 - x - 3 \geq 4 - 2x$$

$$-x - 2 \geq 4 - 2x$$

$$x \geq 6$$

$$\therefore \text{Solution: } \underline{x \geq 6} \mid \text{ or } [6, \infty)$$

Exercise

Solve the inequality equation $5(3 - x) \leq 3x - 1$

Solution

$$15 - 5x \leq 3x - 1$$

$$-8x \leq -16$$

$$-x \leq -2$$

$$\therefore \text{Solution: } \underline{x \geq 2} \mid \text{ or } [2, \infty)$$

Exercise

Solve the inequality equation $\frac{x}{4} - \frac{1}{2} \leq \frac{x}{2} + 1$

Solution

$$4 \times \frac{x}{4} - \frac{1}{2} \leq \frac{x}{2} + 1$$

$$x - 2 \leq 2x + 4$$

$$-x \leq 6$$

$$\therefore \text{Solution: } \underline{x \geq -6} \mid \text{ or } [-6, \infty)$$

Exercise

Solve the inequality equation $\frac{3x}{10} + 1 \geq \frac{1}{5} - \frac{x}{10}$

Solution

$$10 \times \frac{3x}{10} + 1 \geq \frac{1}{5} - \frac{x}{10}$$

$$3x + 10 \geq 2 - x$$

$$4x \geq -8$$

$$\therefore \text{Solution: } \underline{x \geq -2} \mid \text{ or } [-2, \infty)$$

Exercise

Solve $6x - (2x + 3) \geq 4x - 5$

Solution

$$6x - 2x - 3 \geq 4x - 5$$

$$4x - 3 \geq 4x - 5$$

$$4x - 4x \geq 3 - 5$$

$$0 \geq -2 \quad (\text{true})$$

$$\therefore \text{Solution: } \mathbb{R} \quad (-\infty, \infty)$$

Exercise

Solve $\frac{2x-5}{-8} \leq 1-x$

Solution

$$(-8) \frac{2x-5}{-8} \geq (-8)(1-x)$$

$$2x - 5 \geq -8 + 8x$$

$$2x - 8x \geq -8 + 5$$

$$-6x \geq -3$$

$$\frac{-6}{-6}x \leq \frac{-3}{-6}$$

$$\therefore \text{Solution: } \underline{x \leq \frac{1}{2}} \mid \left(-\infty, \frac{1}{2}\right]$$

Exercise

Solve the inequality equation $1 - \frac{x}{2} > 4$

Solution

$$2 \times 1 - \frac{x}{2} > 4$$

$$2 - x > 8$$

$$-x > 6$$

$$\therefore \text{Solution: } \underline{x < -6} \mid \text{ or } (-\infty, -6)$$

Exercise

Solve the inequality equation $7 - \frac{4}{5}x < \frac{3}{5}$

Solution

$$5 \times 7 - \frac{4}{5}x < \frac{3}{5}$$

$$35 - 4x < 3$$

$$-4x > -32$$

$$\therefore \text{Solution: } \underline{x < 8} \mid \text{ or } (-\infty, 8)$$

Exercise

Solve the inequality equation $\frac{x-4}{6} \geq \frac{x-2}{9} + \frac{5}{18}$

Solution

$$18 \times \frac{x-4}{6} \geq \frac{x-2}{9} + \frac{5}{18}$$

$$3x - 12 \geq 2x - 4 + 5$$

$$3x - 12 \geq 2x + 1$$

$$\therefore \text{Solution: } \underline{x \geq -13} \mid \text{ or } [-13, \infty)$$

Exercise

Solve the inequality equation $\frac{4x-3}{6} + 2 \geq \frac{2x-1}{12}$

Solution

$$12 \times \frac{4x-3}{6} + 2 \geq \frac{2x-1}{12}$$

$$8x - 6 + 24 \geq 2x - 1$$

$$8x + 18 \geq 2x - 1$$

$$6x \geq -19$$

$$\therefore \text{Solution: } \underline{x \geq -\frac{19}{6}} \mid \text{ or } \left[-\frac{19}{6}, \infty\right)$$

Exercise

Solve the inequality equation $4(3x - 2) - 3x < 3(1 + 3x) - 7$

Solution

$$12x - 8 - 3x < 3 + 9x - 7$$

$$9x - 8 < 9x - 4$$

$$-8 < -4 \quad \text{True}$$

\therefore **Solution:** \mathbb{R}

Exercise

Solve the inequality equation $3(x - 8) - 2(10 - x) < 5(x - 1)$

Solution

$$3x - 24 - 20 + 2x < 5x - 5$$

$$5x - 44 < 5x - 5$$

$$-44 < -5 \quad \text{True}$$

\therefore **Solution:** \mathbb{R}

Exercise

Solve the inequality equation $8(x + 1) \leq 7(x + 5) + x$

Solution

$$8x + 8 \leq 7x + 35 + x$$

$$8x + 8 \leq 8x + 35$$

$$8 \leq 35$$

\therefore **Solution:** \mathbb{R}

Exercise

Solve the inequality equation $4(x - 1) \geq 3(x - 2) + x$

Solution

$$4x - 4 \geq 3x - 6 + x$$

$$4x - 4 \geq 4x - 6$$

$$-4 \geq -6 \quad \text{True}$$

\therefore **Solution:** \mathbb{R}

Exercise

Solve the inequality equation $7(x + 4) - 13 > 12 + 13(3 + x)$

Solution

$$7x + 28 - 13 > 12 + 39 + 13x$$

$$7x + 15 > 51 + 13x$$

$$-6x > 36$$

$$\therefore \text{Solution: } \underline{x < -9} \quad \text{or} \quad (-\infty, -9)$$

Exercise

Solve the inequality equation $-2[7x - (2x - 3)] < -2(x + 1)$

Solution

$$-2(7x - 2x + 3) < -2x - 2$$

$$-2(5x + 3) < -2x - 2$$

$$-10x - 6 < -2x - 2$$

$$-8x < 4$$

$$\therefore \text{Solution: } \underline{x > \frac{1}{2}} \quad \text{or} \quad \left(\frac{1}{2}, \infty\right)$$

Exercise

Solve the inequality equation $6 - \frac{2}{3}(3x - 12) \leq \frac{2}{5}(10x + 50)$

Solution

$$15 \times \quad 6 - \frac{2}{3}(3x - 12) \leq \frac{2}{5}(10x + 50)$$

$$90 - 10(3x - 12) \leq 6(10x + 50)$$

$$90 - 30x + 120 \leq 60x + 300$$

$$210 - 30x \leq 60x + 300$$

$$-90x \leq 90$$

$$\therefore \text{Solution: } \underline{x \geq -1} \quad \text{or} \quad [-1, \infty)$$

Exercise

Solve the inequality equation $\frac{2}{7}(7 - 21x) - 4 < 10 - \frac{3}{11}(11x - 11)$

Solution

$$77 \times \frac{2}{7}(7 - 21x) - 4 < 10 - \frac{3}{11}(11x - 11)$$

$$22(7 - 21x) - 308 < 770 - 21(11x - 11)$$

$$154 - 462x - 308 < 770 - 231x + 231$$

$$-462x - 154 < -231x + 1,001$$

$$-231x < 1,155$$

$$-x < 5$$

$$\therefore \text{Solution: } \underline{x > 5} \quad \text{or } (5, \infty)$$

Exercise

Solve the inequality equation $3[3(x + 5) + 8x + 7] + 5[3(x - 6) - 2(3x - 5)] < 2(4x + 3)$

Solution

$$3(3x + 15 + 8x + 7) + 5(3x - 18 - 6x + 10) < 8x + 6$$

$$3(11x + 22) + 5(-3x - 8) < 8x + 6$$

$$33x + 66 - 15x - 40 < 8x + 6$$

$$18x + 26 < 8x + 6$$

$$10x < -20$$

$$\therefore \text{Solution: } \underline{x < -2} \quad \text{or } (-\infty, -2)$$

Exercise

Solve the inequality equation $5[3(2 - 3x) - 2(5 - x)] - 6[5(x - 2) - 2(4x - 3)] < 3x + 19$

Solution

$$5(6 - 9x - 10 + 2x) - 6(5x - 10 - 8x + 6) < 3x + 19$$

$$5(-7x - 4) - 6(-3x - 4) < 3x + 19$$

$$-35x - 20 + 18x + 24 < 3x + 19$$

$$-17x + 4 < 3x + 19$$

$$-20x < 15$$

$$\therefore \text{Solution: } \underline{x > -\frac{3}{4}} \quad \text{or } \left(-\frac{3}{4}, \infty\right)$$

Exercise

Solve the inequality equation $0 \leq 3x - 1 \leq 10$

Solution

$$0 + 1 \leq 3x - 1 + 1 \leq 10 + 1$$

$$1 \leq 3x \leq 11$$

$$\therefore \text{Solution: } \underline{\frac{1}{3} \leq x \leq \frac{11}{3}} \quad |$$

Exercise

Solve the inequality equation $0 \leq 1 - 3x \leq 10$

Solution

$$-1 \leq -3x \leq 9$$

$$-\frac{1}{3} \leq -x \leq 3$$

$$\therefore \text{Solution: } \underline{-3 \leq x \leq \frac{1}{3}} \quad |$$

Exercise

Solve the inequality equation $0 \leq 2x + 6 \leq 54$

Solution

$$-6 \leq 2x \leq 48$$

$$\therefore \text{Solution: } \underline{-3 \leq x \leq 24} \quad |$$

Exercise

Solve the inequality equation $-3 \leq \frac{2}{3}x - 5 \leq -1$

Solution

$$-3 \leq \frac{2}{3}x - 5 \leq -1$$

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

$$2 \leq \frac{2}{3}x \leq 4$$

$$2 \cdot \frac{3}{2} \leq \frac{3}{2} \cdot \frac{2}{3}x \leq \frac{3}{2} \cdot 4$$

$$\therefore \text{Solution: } \underline{3 \leq x \leq 6} \quad |$$

Exercise

Solve $-6 \leq 6x + 3 \leq 21$

Solution

$$-6 - 3 \leq 6x + 3 - 3 \leq 21 - 3$$

$$-9 \leq 6x \leq 18$$

$$-\frac{9}{6} \leq \frac{6}{6}x \leq \frac{18}{6}$$

$$\therefore \text{Solution: } \underline{-\frac{3}{2} \leq x \leq 3} \quad \left[-\frac{3}{2}, 3 \right]$$

Exercise

Solve the inequality equation: $1 \leq 2x + 3 < 11$

Solution

$$1 - 3 \leq 2x + 3 - 3 < 11 - 3$$

$$-2 \leq 2x < 8$$

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

$$\therefore \text{Solution: } \underline{-1 \leq x < 4}$$

Exercise

Solve the inequality equation $|x| < 2$

Solution

$$\therefore \text{Solution: } \underline{-2 < x < 2}$$

Exercise

Solve the inequality equation $|x| \geq 2$

Solution

$$\therefore \text{Solution: } \underline{x \leq -2 \quad x \geq 2}$$

Exercise

Solve the inequality equation $|x - 2| < 1$

Solution

$$-1 < x - 2 < 1$$

$$\therefore \text{Solution: } \underline{1 < x < 3}$$

Exercise

Solve the inequality equation $|x - 1| < 4$

Solution

$$-4 < x - 1 < 4$$

$$\therefore \text{Solution: } \underline{-3 < x < 5}$$

Exercise

Solve the inequality equation $|x + 2| \geq 1$

Solution

$$x + 2 \leq -1 \qquad x + 2 \geq 1$$

$$x \leq -3 \qquad x \geq -1$$

$$\therefore \text{Solution: } \underline{x \leq -3 \quad x \geq -1}$$

Exercise

Solve the inequality equation $|x + 1| \geq 4$

Solution

$$x + 1 \leq -4 \qquad x + 1 \geq 4$$

$$x \leq -5 \qquad x \geq 3$$

$$\therefore \text{Solution: } \underline{x \leq -5 \quad x \geq 3}$$

Exercise

Solve the inequality equation $|3x + 5| < 17$

Solution

$$-17 < 3x + 5 < 17$$

$$-22 < 3x < 12$$

$$\therefore \text{Solution: } \underline{-11 < x < 4}$$

Exercise

Solve the inequality equation $|5x - 2| < 13$

Solution

$$-13 < 5x - 2 < 13$$

$$-11 < 5x < 15$$

$$\therefore \text{Solution: } \underline{-\frac{11}{5} < x < 3}$$

Exercise

Solve the inequality equation $|5x - 2| \geq 13$

Solution

$$5x - 2 \leq -13 \quad 5x - 2 \geq 13$$

$$5x \leq -11 \quad 5x \geq 15$$

$$x \leq -\frac{11}{5} \quad x \geq 3$$

$$\therefore \text{Solution: } \underline{x \leq -\frac{11}{5} \quad x \geq 3}$$

Exercise

Solve the inequality equation $|2(x - 1) + 4| \leq 8$

Solution

$$-8 \leq 2x - 2 + 4 \leq 8$$

$$-8 \leq 2x + 2 \leq 8$$

$$-10 \leq 2x \leq 6$$

$$\therefore \text{Solution: } \underline{-5 \leq x \leq 3}$$

Exercise

Solve the inequality equation $|3(x - 1) + 2| \leq 20$

Solution

$$-20 \leq 3x - 3 + 2 \leq 20$$

$$-20 \leq 3x - 1 \leq 20$$

$$-19 \leq 3x \leq 21$$

$$\therefore \text{Solution: } \underline{-\frac{19}{3} \leq x \leq 7}$$

Exercise

Solve the inequality equation $\left| \frac{2x+6}{3} \right| > 2$

Solution

$$|2x+6| > 6$$

$$2x+6 < -6 \qquad 2x+6 > 6$$

$$2x < -12 \qquad 2x > 0$$

$$x < -6 \qquad x > 0$$

$$\therefore \text{Solution: } \underline{x < -6 \quad x > 0}$$

Exercise

Solve the inequality equation $\left| \frac{3x-3}{4} \right| < 6$

Solution

$$\frac{3}{4}|x-1| < 6$$

$$|x-1| < 8$$

$$-8 < x-1 < 8$$

$$\therefore \text{Solution: } \underline{-7 < x < 9}$$

Exercise

Solve the inequality equation $\left| \frac{2x+2}{4} \right| \geq 2$

Solution

$$\frac{1}{2}|x+1| \geq 2$$

$$|x+1| \geq 4$$

$$x+1 \leq -4 \qquad x \geq 3$$

$$\therefore \text{Solution: } \underline{x \leq -4 \quad x \geq 3}$$

Exercise

Solve the inequality equation $\left| \frac{3x-3}{9} \right| \leq 1$

Solution

$$\frac{1}{3}|x-1| \leq 1$$

$$|x-1| \leq 3$$

$$-3 \leq x-1 \leq 3$$

$$\therefore \text{Solution: } \underline{-2 \leq x \leq 4}$$

Exercise

Solve the inequality equation $\left|3 - \frac{2x}{3}\right| > 5$

Solution

$$\frac{1}{3}|9 - 2x| > 5$$

$$|9 - 2x| > 15$$

$$9 - 2x < -15 \quad 9 - 2x > 15$$

$$-2x < -24 \quad -2x > 6$$

$$x > 12 \quad x < -3$$

$$\therefore \text{Solution: } \underline{x < -3 \quad x > 12}$$

Exercise

Solve the inequality equation $\left|3 - \frac{3x}{4}\right| < 9$

Solution

$$\frac{3}{4}|4 - x| < 9$$

$$|4 - x| < 12$$

$$-12 < 4 - x < 12$$

$$-16 < -x < 8$$

$$16 > x > -8$$

$$\therefore \text{Solution: } \underline{-8 < x < 16}$$

Exercise

Solve the inequality equation $|x - 2| < -1$

Solution

Impossible, since Absolute value can't be negative.

\therefore No **Solution**

Exercise

Solve the inequality equation $|x + 2| < -3$

Solution

Impossible, since Absolute value can't be negative.

\therefore No ***Solution***

Exercise

Solve the inequality equation $|x + 6| > -10$

Solution

\therefore ***Solution:*** \mathbb{R}

Exercise

Solve the inequality equation $|x + 2| > -8$

Solution

\therefore ***Solution:*** \mathbb{R}

Exercise

Solve the inequality equation $|x + 2| + 9 \leq 16$

Solution

$$|x + 2| \leq 5$$

$$-5 \leq x + 2 \leq 5$$

\therefore ***Solution:*** $-7 \leq x \leq 3$

Exercise

Solve the inequality equation $|x - 2| + 4 \geq 5$

Solution

$$|x - 2| \geq 1$$

$$x - 2 \leq -1$$

$$x - 2 \geq 1$$

$$x \leq 1$$

$$x \geq 3$$

\therefore ***Solution:*** $x \leq 1 \quad x \geq 3$

Exercise

Solve the inequality equation $2|2x - 3| + 10 > 12$

Solution

$$2|2x - 3| > 2$$

$$|2x - 3| > 1$$

$$2x - 3 < -1 \quad 2x - 3 > 1$$

$$2x < 2 \quad 2x > 4$$

$$x < 1 \quad x > 2$$

$$\therefore \text{Solution: } \underline{x < 1 \quad x > 3}$$

Exercise

Solve the inequality equation $3|2x - 1| + 2 < 8$

Solution

$$3|2x - 1| < 6$$

$$|2x - 1| < 2$$

$$-2 < 2x - 1 < 2$$

$$-1 < 2x < 3$$

$$\therefore \text{Solution: } \underline{-\frac{1}{2} < x < \frac{3}{2}}$$

Exercise

Solve the inequality equation $-4|1 - x| < -16$

Solution

$$|1 - x| > 4$$

$$1 - x < -4 \quad 1 - x > 4$$

$$-x < -5 \quad -x > 3$$

$$x > 5 \quad x < -3$$

$$\therefore \text{Solution: } \underline{x < -3 \quad x > 5}$$

Exercise

Solve the inequality equation $-2|5 - x| < -6$

Solution

$$|5 - x| > 3$$

$$5 - x < -3$$

$$5 - x > 3$$

$$-x < -8$$

$$-x > -2$$

$$x > 8$$

$$x < 2$$

$$\therefore \text{Solution: } \underline{x < 2 \quad x > 8}$$

Exercise

Solve the inequality equation $3 \leq |2x - 1|$

Solution

$$|2x - 1| \geq 3$$

$$2x - 1 \leq -3$$

$$2x - 1 \geq 3$$

$$2x \leq -2$$

$$2x \geq 4$$

$$x \leq -1$$

$$x \geq 2$$

$$\therefore \text{Solution: } \underline{x \leq -1 \quad x \geq 2}$$

Exercise

Solve the inequality equation $9 \leq |4x + 7|$

Solution

$$|4x + 7| \geq 9$$

$$4x + 7 \leq -9$$

$$4x + 7 \geq 9$$

$$4x \leq -16$$

$$4x \geq 2$$

$$x \leq -4$$

$$x \geq \frac{1}{2}$$

$$\therefore \text{Solution: } \underline{x \leq -4 \quad x \geq \frac{1}{2}}$$

Exercise

Solve the inequality equation: $12 < \left| -2x + \frac{6}{7} \right| + \frac{3}{7}$

Solution

$$(7)12 < \left| -(7)2x + (7)\frac{6}{7} \right| + (7)\frac{3}{7}$$

Multiply by 7 both sides

$$84 < \left| -14x + 6 \right| + 3$$

$$81 < \left| -14x + 6 \right|$$

$$|-14x + 6| > 81$$

$$-14x + 6 < -81 \qquad -14x + 6 > 81$$

$$-14x < -81 - 6 \qquad -14x > 81 - 6$$

$$-14x < -87 \qquad -14x > 75$$

$$x > \frac{87}{14} \qquad x < -\frac{75}{14}$$

$$\therefore \text{Solution: } \underline{x < -\frac{75}{14} \quad x > \frac{87}{14}} \quad \left(-\infty, -\frac{75}{14} \right) \cup \left(\frac{87}{14}, \infty \right)$$

Exercise

Solve the inequality equation: $4 + \left| 3 - \frac{x}{3} \right| \geq 9$

Solution

$$\left| 3 - \frac{x}{3} \right| \geq 9 - 4$$

$$\left| 3 - \frac{x}{3} \right| \geq 5$$

$$\left| (3)3 - (3)\frac{x}{3} \right| \geq (3)5$$

$$|9 - x| \geq 15$$

$$9 - x \leq -15 \qquad 9 - x \geq 15$$

$$-x \leq -24 \qquad -x \geq 6$$

$$x \geq 24 \qquad x \leq -6$$

$$\therefore \text{Solution: } \underline{x \leq -6 \quad x \geq 24} \quad (-\infty, -6] \cup [24, \infty)$$

Exercise

Solve the inequality equation: $|x - 2| < 5$

Solution

$$-5 < x - 2 < 5$$

$$\therefore \text{Solution: } \underline{-3 < x < 7}$$

Exercise

Solve the inequality equation: $|2x + 1| < 7$

Solution

$$-7 < 2x + 1 < 7$$

$$-7 - 1 < 2x + 1 - 1 < 7 - 1$$

$$-8 < 2x < 6$$

$$-\frac{8}{2} < \frac{2}{2}x < \frac{6}{2}$$

$$\therefore \text{Solution: } \underline{-4 < x < 3}$$

Exercise

Solve the inequality equation: $|5x + 2| - 2 < 3$

Solution

$$|5x + 2| < 5$$

$$-5 < 5x + 2 < 5$$

$$-7 < 5x < 3$$

$$\therefore \text{Solution: } \underline{-\frac{7}{5} < x < \frac{3}{5}} \quad \left(-\frac{7}{5}, \frac{3}{5}\right)$$

Exercise

Solve the inequality equation: $|2 - 7x| - 1 > 4$

Solution

$$|2 - 7x| > 5$$

$$2 - 7x < -5$$

$$2 - 7x > 5$$

$$-7x < -7$$

$$-7x > 3$$

$$x > 1$$

$$x < -\frac{3}{7}$$

$$\therefore \text{Solution: } \underline{x < -\frac{3}{7} \quad x > \frac{1}{14}} \quad \left(-\infty, -\frac{3}{7}\right) \cup \left(\frac{1}{14}, \infty\right)$$

Exercise

Solve the inequality equation: $|3x - 4| < 2$

Solution

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

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

$$2 < 3x < 6$$

$$\therefore \text{Solution: } \underline{\frac{2}{3} < x < 2} \quad \underline{\left(\frac{2}{3}, 2\right)}$$

Exercise

Solve the inequality equation: $|2x + 5| \geq 3$

Solution

$$2x + 5 \leq -3$$

$$2x + 5 \geq 3$$

$$2x \leq -8$$

$$2x \geq -2$$

$$x \leq -4$$

$$x \geq -1$$

$$\therefore \text{Solution: } \underline{x \leq -4 \quad x \geq -1} \quad | \quad (-\infty, -4] \cup [-1, \infty)$$

Exercise

Solve $|12 - 9x| \geq -12$

Solution

\therefore **Solution** set: $(-\infty, \infty)$ because the absolute value always greater than any negative number.

Exercise

Solve $|6 - 3x| < -11$

Solution

\therefore **No solution**, because the absolute value cannot be less than any negative number

Exercise

Solve the inequality equation $|7 + 2x| < 0$

Solution

\therefore **No solution**, because the absolute value cannot be any negative number

Exercise

Solve: $x^2 - 7x + 10 > 0$

Solution

$$x^2 - 7x + 10 > 0$$

$$(x - 5)(x - 2) > 0$$

$$\underline{x = 2, 5}$$

$$\therefore \text{Solution: } \underline{x < 2 \quad x > 5} \quad | \quad (-\infty, 2) \cup (5, \infty)$$

0	2	5
+	-	+
<hr/>		

Exercise

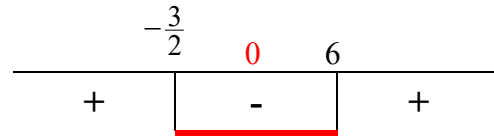
Solve: $2x^2 - 9x \leq 18$

Solution

$$2x^2 - 9x - 18 \leq 0$$

$$(2x + 3)(x - 6) \leq 0$$

$$\therefore \text{Solution: } \underline{-\frac{3}{2} \leq x \leq 6} \quad \left[-\frac{3}{2}, 6\right]$$



Exercise

Solve the inequality: $x^2 - 5x + 4 > 0$

Solution

$$x^2 - 5x + 4 > 0$$

$$x = 1, 4$$

$$\therefore \text{Solution: } \underline{x < 1 \quad x > 4} \quad \underline{(-\infty, 1) \cup (4, \infty)}$$

Exercise

Solve $x^2 + x - 2 > 0$

Solution

$$x^2 + x - 2 = 0 \rightarrow x = -2, 1$$

$$\therefore \text{Solution: } \underline{x < -2 \quad x > 1} \quad \underline{(-\infty, -2) \cup (1, \infty)}$$

Exercise

Solve $x^2 - 4x + 12 < 0$

Solution

$$x^2 - 4x + 12 = 0$$

$$x = \frac{4 \pm \sqrt{16 - 48}}{2}$$

$$= \frac{4 \pm \sqrt{-32}}{2} \quad \text{Complex number}$$

\therefore No **Solution**

Exercise

Solve the inequality equation $x^2 + 7x > 0$

Solution

$$x^2 + 7x = 0$$

$$x(x + 7) = 0$$

$$\underline{x = 0, -7 \mid}$$

$$\therefore \text{Solution: } \underline{x < -7 \quad x > 0 \mid}$$

Exercise

Solve the inequality equation $x^2 - 49 < 0$

Solution

$$x^2 - 49 = 0$$

$$\underline{x = \pm 7 \mid}$$

$$\therefore \text{Solution: } \underline{-7 < x < 7 \mid}$$

Exercise

Solve the inequality equation $x^2 - 5x \geq 0$

Solution

$$x^2 - 5x = 0$$

$$x(x - 5) = 0$$

$$\underline{x = 0, 5 \mid}$$

$$\therefore \text{Solution: } \underline{x \leq 0 \quad x \geq 5 \mid}$$

Exercise

Solve the inequality equation $x^2 - 16 \leq 0$

Solution

$$x^2 - 16 = 0$$

$$x^2 = 16$$

$$\underline{x = \pm 4 \mid}$$

$$\therefore \text{Solution: } \underline{-4 \leq x \leq 4 \mid}$$

Exercise

Solve the inequality equation $x^2 + 7x + 10 < 0$

Solution

$$x^2 + 7x + 10 = 0$$

$$x = \frac{-7 \pm \sqrt{49 - 40}}{2}$$

$$= \frac{-7 \pm 3}{2}$$

$$= \begin{cases} \frac{-7-3}{2} = -5 \\ \frac{-7+3}{2} = -2 \end{cases}$$

$$\therefore \text{Solution: } \underline{-5 < x < -2}$$

Exercise

Solve the inequality equation $x^2 - 3x \geq 28$

Solution

$$x^2 - 3x - 28 = 0$$

$$x = \frac{3 \pm \sqrt{121}}{2}$$

$$= \begin{cases} \frac{3-11}{2} = -4 \\ \frac{3+11}{2} = 7 \end{cases}$$

$$\therefore \text{Solution: } \underline{x \leq -4 \quad x \geq 7}$$

Exercise

Solve the inequality equation $x^2 + 5x + 6 < 0$

Solution

$$x^2 + 5x + 6 = 0$$

$$x = \frac{-5 \pm 1}{2}$$

$$= \begin{cases} \frac{-5-1}{2} = -3 \\ \frac{-5+1}{2} = -2 \end{cases}$$

$$\therefore \text{Solution: } \underline{-3 < x < -2}$$

Exercise

Solve the inequality equation $x^2 < -x + 30$

Solution

$$x^2 + x - 30 = 0$$

$$x = \frac{-1 \pm 11}{2}$$

$$= \begin{cases} \frac{-1-11}{2} = -6 \\ \frac{-1+11}{2} = 5 \end{cases}$$

$$\therefore \text{Solution: } \underline{-6 < x < 5}$$

Exercise

Solve: $x^3 - 3x^2 - 9x + 27 < 0$

Solution

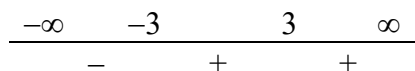
$$x^3 - 3x^2 - 9x + 27 = 0$$

$$x^2(x-3) - 9(x-3) = 0$$

$$(x-3)(x^2-9) = 0$$

$$\rightarrow \begin{cases} x-3=0 \rightarrow \underline{x=3} \\ x^2-9=0 \rightarrow x^2=9 \rightarrow \underline{x=\pm 3} \end{cases}$$

$$\therefore \text{Solution: } \underline{x < -3} \quad \underline{(-\infty, -3)}$$



Exercise

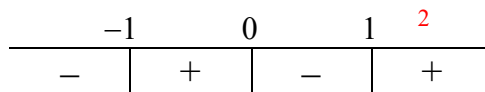
Solve $x^3 - x > 0$

Solution

$$x(x^2-1) = 0$$

$$\rightarrow \begin{cases} x = 0 \\ x^2-1=0 \rightarrow x^2=1 \rightarrow x = \pm 1 \end{cases}$$

$$\therefore \text{Solution: } \underline{-1 < x < 0 \quad x > 1} \quad \underline{(-1, 0) \cup (1, \infty)}$$



Exercise

$$x^3 + 3x^2 \leq x + 3$$

Solution

$$x^3 + 3x^2 - x - 3 = 0$$

$$x^2(x+3) - (x+3) = 0$$

$$(x+3)(x^2-1) = 0$$

$$\begin{cases} x+3=0 \rightarrow x=-3 \\ x^2-1=0 \rightarrow x^2=1 \rightarrow x=\pm 1 \end{cases}$$

	-3		-1	0		1	
	-		+		-		+

$$\therefore \text{Solution: } \underline{-1 < x < 0 \quad x > 1} \quad \underline{(-\infty, -3] \cup [-1, 1]}$$

Exercise

$$\text{Solve } x^3 + x^2 \geq 48x$$

Solution

$$x^3 + x^2 - 48x = 0$$

$$x(x^2 + x - 48) = 0$$

$$x = 0 \quad x^2 + x - 48 = 0$$

$$x = \frac{-1 \pm \sqrt{1+192}}{2}$$

	$\frac{-1-\sqrt{193}}{2}$		0	1		$\frac{-1+\sqrt{193}}{2}$	
	-		+		-		+

$$\therefore \text{Solution: } \underline{\frac{-1-\sqrt{193}}{2} < x < 0 \quad x > \frac{-1+\sqrt{193}}{2}} \quad \underline{\left[\frac{-1-\sqrt{193}}{2}, 0 \right] \cup \left[\frac{-1+\sqrt{193}}{2}, \infty \right)}$$

Exercise

$$\text{Solve the inequality equation } x^3 - x^2 - 16x + 16 < 0$$

Solution

$$x^2(x-1) - 16(x-1) = 0$$

$$(x-1)(x^2-16) = 0$$

$$x = 1, \pm 4$$

	-4	0		1		4	
	-		+		-		+

$$\therefore \text{Solution: } \underline{x < -4 \quad 1 < x < 4}$$

Exercise

Solve the inequality equation $x^3 + x^2 - 9x - 9 > 0$

Solution

$$x^2(x+1) - 9(x+1) = 0$$

$$(x+1)(x^2 - 9) = 0$$

$$x = -1, \pm 3$$

$$\therefore \text{Solution: } \underline{-3 < x < -1 \quad x > 3}$$

	-3	-1	0	3	
-	+	-	+		

Exercise

Solve the inequality equation $x^3 + 3x^2 - 4x - 12 \geq 0$

Solution

$$x^2(x+3) - 4(x+3) = 0$$

$$(x+3)(x^2 - 4) = 0$$

$$x = -3, \pm 2$$

$$\therefore \text{Solution: } \underline{-3 < x < -2 \quad x > 2}$$

	-3	-2	0	2	
-	+	-	+		

Exercise

Solve the inequality equation $x^4 - 20x^2 + 64 \leq 0$

Solution

$$x^4 - 20x^2 + 64 = 0$$

$$x^2 = \frac{20 \pm \sqrt{400 - 256}}{2}$$

$$= \begin{cases} \frac{20-12}{2} = 4 \\ \frac{20+12}{2} = 16 \end{cases}$$

$$\begin{cases} x^2 = 4 \rightarrow x = \pm 2 \\ x^2 = 16 \rightarrow x = \pm 4 \end{cases}$$

$$\therefore \text{Solution: } \underline{-4 \leq x \leq -2 \quad 2 \leq x \leq 4}$$

	-4	-2	0	2	4	
+	-	+	-	+		

Exercise

Solve the inequality equation $x^4 - 10x^2 + 9 \geq 0$

Solution

$$x^4 - 10x^2 + 9 = 0$$

$$\begin{cases} x^2 = 1 \rightarrow x = \pm 1 \\ x^2 = 9 \rightarrow x = \pm 3 \end{cases}$$

$$\therefore \text{Solution: } \underline{x \leq -3 \quad -1 \leq x \leq 1 \quad x \geq 3}$$

-3	-1	0	1	3
+	-	+	-	+

Exercise

Solve the inequality equation $\frac{x+4}{x-1} < 0$

Solution

Restriction: $x \neq 1$

$$\frac{x+4}{x-1} = 0$$

$$\underline{x = -4}$$

$$\therefore \text{Solution: } \underline{-4 < x < 1}$$

	-4	1	
+		-	+

Exercise

Solve the inequality equation $\frac{x-2}{x+3} > 0$

Solution

Restriction: $x \neq -3$

$$\frac{x-2}{x+3} = 0$$

$$\underline{x = 2}$$

$$\therefore \text{Solution: } \underline{x < -3 \quad x > 2}$$

-3	0	2
+	-	+

Exercise

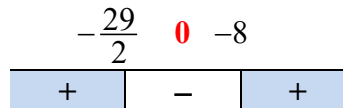
Solve the inequality equation $\frac{x-5}{x+8} \geq 3$

Solution

Restriction: $x \neq -8$

$$\begin{aligned}\frac{x-5}{x+8} - 3 &= 0 \\ x-5-3x-24 &= 0 \\ -2x &= 29 \\ x &= -\frac{29}{2}\end{aligned}$$

$$\therefore \text{Solution: } \underline{x \leq -\frac{29}{2} \quad x > -8}$$



Exercise

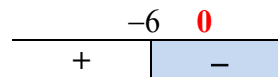
Solve the inequality equation $\frac{x-4}{x+6} \leq 1$

Solution

Restriction: $x \neq -6$

$$\begin{aligned}\frac{x-4}{x+6} - 1 &= 0 \\ x-4-x-6 &= 0 \\ -10 &= 0 \quad \times\end{aligned}$$

$$\therefore \text{Solution: } \underline{x > -6}$$



Exercise

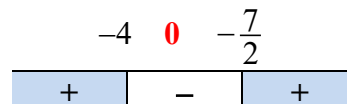
Solve the inequality equation $\frac{x}{2x+7} \geq 4$

Solution

Restriction: $x \neq -\frac{7}{2}$

$$\begin{aligned}\frac{x}{2x+7} - 4 &= 0 \\ x-8x-28 &= 0 \\ 7x &= -28 \\ x &= -4\end{aligned}$$

$$\therefore \text{Solution: } \underline{x \leq -4 \quad x > -\frac{7}{2}}$$



Exercise

Solve the inequality equation $\frac{x}{3x-5} \leq -5$

Solution

Restriction: $x \neq \frac{5}{3}$

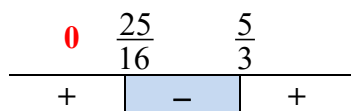
$$\frac{x}{3x-5} + 5 = 0$$

$$x + 15x - 25 = 0$$

$$16x = 25$$

$$x = \frac{25}{16} \quad |$$

$$\therefore \text{Solution: } \frac{25}{16} \leq x < \frac{5}{3} \quad |$$



Exercise

Solve the inequality equation $\frac{x+2}{x-5} \leq 2$

Solution

Restriction: $x \neq 5$

$$\frac{x+2}{x-5} - 2 = 0$$

$$x + 2 - 2x + 10 = 0$$

$$x = 12 \quad |$$

$$\therefore \text{Solution: } 5 \leq x < 12 \quad |$$



Exercise

Solve the inequality equation $\frac{3x+1}{x-2} \geq 4$

Solution

Restriction: $x \neq 2$

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

$$3x + 1 - 4x + 8 = 0$$

$$x = 9 \quad |$$

$$\therefore \text{Solution: } 2 \leq x < 9 \quad |$$



Exercise

Solve the inequality equation $\frac{x}{x-3} > 0$

Solution

Restriction: $x \neq 3$

$$\frac{x}{x-3} = 0$$

$$x = 0$$

\therefore **Solution:** $x < 0 \quad x > 3 \quad | \quad (-\infty, 0) \cup (3, \infty) \quad |$

	0		3
+		-	+

Exercise

Solve the inequality equation $\frac{x-3}{x+2} \geq 0$

Solution

Restriction: $x \neq -2$

$$\frac{x-3}{x+2} = 0$$

$$x = 3$$

\therefore **Solution:** $x < -2 \quad x \geq 3 \quad |$

	-2	0	3
+		-	+

Exercise

Solve the inequality equation $\frac{x-2}{x+2} \leq 2$

Solution

Restriction: $x \neq -2$

$$\frac{x-2}{x+2} - 2 = 0$$

$$x-2-2x-4=0$$

$$-x-6=0$$

$$x = -6$$

\therefore **Solution:** $x \leq -6 \quad x > -2 \quad | \quad (-\infty, -6] \cup (-2, \infty) \quad |$

	-6		-2
-		+	-

Exercise

Solve the inequality equation $\frac{x+2}{x-2} \geq 2$

Solution

Restriction: $x \neq 2$

$$\frac{x+2}{x-2} - 2 = 0$$

$$x+2-2x+4=0$$

$$x = 6$$

$$\therefore \text{Solution: } 2 < x \leq 6$$



Exercise

Solve the inequality equation $\frac{x+2}{3+2x} \leq 5$

Solution

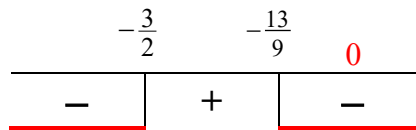
Restriction: $x \neq -\frac{3}{2}$

$$\frac{x+2}{3+2x} - 5 = 0$$

$$x+2-15-10x=0$$

$$-9x-13=0$$

$$x = -\frac{13}{9}$$



$$\therefore \text{Solution: } x < -\frac{3}{2} \quad x > -\frac{13}{9} \quad \left(-\infty, -\frac{3}{2} \right) \cup \left[-\frac{13}{9}, \infty \right)$$

Exercise

Solve the inequality $\frac{x+6}{x-14} \geq 1$

Solution

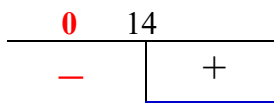
Restriction: $x-14 \neq 0 \Rightarrow x \neq 14$

$$\frac{x+6}{x-14} - 1 = 0$$

$$x+6-x+14=0$$

$$20=0 \quad (\text{Impossible}) \quad \text{No Solution}$$

$$\therefore \text{Solution: } x > 14 \quad (14, \infty)$$



Exercise

Solve: $\frac{x-3}{x+4} \geq \frac{x+2}{x-5}$

Solution

Conditions: $x+4 \neq 0 \rightarrow x \neq -4$ and $x-5 \neq 0 \rightarrow x \neq 5$

$$\frac{x-3}{x+4} - \frac{x+2}{x-5} = 0$$

$$\frac{0-3}{0+4} - \frac{0+2}{0-5} = \frac{-3}{4} - \frac{2}{-5} = \frac{-3}{4} + \frac{2}{5} = -$$

$$(x+4)(x-5)\left[\frac{x-3}{x+4}-\frac{x+2}{x-5}\right]=0$$

$$(x-5)(x-3)-(x+4)(x+2)=0$$

$$x^2-3x-5x+15-(x^2+2x+4x+8)=0$$

$$x^2-3x-5x+15-x^2-2x-4x-8=0$$

$$-14x+7=0$$

$$-14x=-7$$

$$x=\frac{-7}{-14}=\frac{1}{2}$$

	-4	0	1/2	5	
	+	-	+	-	

$$\therefore \text{Solution: } \underline{x < -4 \quad \frac{1}{2} \leq x < 5} \quad \underline{(-\infty, -4) \cup \left[\frac{1}{2}, 5\right)}$$

Exercise

Solve: $\frac{x-4}{x+3}-\frac{x+2}{x-1} \leq 0$

Solution

Conditions: $x \neq -3$ and $x \neq 1$

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

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

$$(x+3)(x-1)\left[\frac{x-4}{x+3}-\frac{x+2}{x-1}\right]=0$$

$$(x-1)(x-4)-(x+3)(x+2)=0$$

$$x^2-5x+4-(x^2+5x+6)=0$$

$$x^2-5x+4-x^2-5x-6=0$$

$$-10x-2=0$$

$$\underline{x = -\frac{1}{5}}$$

	-3	0	$-\frac{1}{5}$	1	
	+	-	+	-	

$$\therefore \text{Solution: } \underline{-3 < x \leq -\frac{1}{5} \quad x > 1} \quad \underline{\left(-3, -\frac{1}{5}\right] \cup (1, \infty)}$$

Exercise

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

Solution

Conditions: $x \neq -3$ and $x \neq -\frac{1}{3}$

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

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

$$(3x+1)(2x-1) - (x+3)(x+1) = 0$$

$$6x^2 - 3x + 2x - 1 - (x^2 + x + 3x + 3) = 0$$

$$6x^2 - x - 1 - x^2 - 4x - 3 = 0$$

$$5x^2 - 5x - 4 = 0$$

$$x = \frac{5 \pm \sqrt{105}}{10} \rightarrow -0.5 \quad 1.5$$

	-3	$\frac{5-\sqrt{105}}{10}$	$-\frac{1}{3}$	0	$\frac{5+\sqrt{105}}{10}$	
+		-		+		-
						+

$$\therefore \text{Solution: } \underline{x < -3 \quad \frac{5-\sqrt{105}}{10} \leq x < -\frac{1}{3} \quad x \geq \frac{5+\sqrt{105}}{10} \quad |}$$

$$(-\infty, -3) \cup \left[\frac{5-\sqrt{105}}{10}, -\frac{1}{3} \right) \cup \left[\frac{5+\sqrt{105}}{10}, \infty \right)$$

Exercise

Solve the inequality equation $\frac{(x+1)(x-4)}{x-2} < 0$

Solution

Restriction: $x \neq 2$

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

$$x = -1, 4 \quad |$$

	-1	0	2		4	
-		+		-		+

$$\therefore \text{Solution: } \underline{x < -1 \quad 2 < x < 4 \quad |}$$

Exercise

Solve the inequality equation $\frac{x(x-4)}{x+5} > 0$

Solution

Restriction: $x \neq -5$

$$\frac{x(x-4)}{x+5} = 0$$

$$x = 0, 4 \quad |$$

	-5		0	1	4	
-		+		-		+

$$\therefore \text{Solution: } \underline{-5 < x < 0 \quad x > 4 \quad |}$$

Exercise

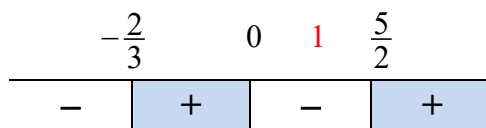
Solve the inequality equation $\frac{6x^2 - 11x - 10}{x} > 0$

Solution

Restriction: $x \neq 0$

$$6x^2 - 11x - 10 = 0$$

$$x = \frac{11 \pm \sqrt{121 + 240}}{12}$$
$$= \left\{ \begin{array}{l} \frac{11-19}{12} = -\frac{2}{3} \\ \frac{11+19}{12} = \frac{5}{2} \end{array} \right|$$



$$\therefore \text{Solution: } \underline{-\frac{2}{3} < x < 0 \quad x > \frac{5}{2}}|$$

Exercise

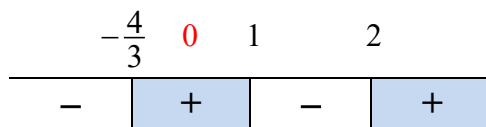
Solve the inequality equation $\frac{3x^2 - 2x - 8}{x-1} \geq 0$

Solution

Restriction: $x \neq 1$

$$3x^2 - 2x - 8 = 0$$

$$x = \frac{2 \pm \sqrt{4 + 96}}{6}$$
$$= \left\{ \begin{array}{l} \frac{2-10}{6} = -\frac{4}{3} \\ \frac{2+10}{6} = 2 \end{array} \right|$$



$$\therefore \text{Solution: } \underline{-\frac{4}{3} \leq x < 1 \quad x \geq 2} |$$

Exercise

Solve the inequality equation $\frac{x^2 - 6x + 9}{x-5} \leq 0$

Solution

Restriction: $x \neq 5$

$$x^2 - 6x + 9 = 0$$

$$(x-3)^2 = 0$$

$$\underline{x = 3 \mid}$$

$$\therefore \text{Solution: } \underline{x < 5 \mid}$$

	0	3	5	
	-	-	+	

Exercise

Solve the inequality equation $\frac{x^2 + 10x + 25}{x + 1} \leq 0$

Solution

Restriction: $x \neq -1$

$$x^2 + 10x + 25 = 0$$

$$(x + 5)^2 = 0$$

$$\underline{x = -5 \mid}$$

$$\therefore \text{Solution: } \underline{x < -1 \mid}$$

	-5	-1	0	
	-	-	+	