

INEQUALITIES

(1) Find the range of x of the following.

i. $3x - 3 > x + 7$

ii. $x + 8 \geq 5x + 12$

iii. $\frac{x+2}{3} > \frac{-4x+1}{2}$

iv. $\frac{x}{2} + 1 > \frac{x}{3} - 2$

v. If $x \geq 0$ $\frac{2}{x+1} \geq \frac{3}{5}$

vi. If $x \geq 0$ $\frac{2}{x-1} \geq \frac{1}{x+2}$

(2). Solve the following inequalities.

i. $3x - 10 > 2x$

ii. $2 - 4x < \frac{2}{3}x + 1$

iii. $\frac{x}{2} - 6 > \frac{x}{3}$

iv. $\frac{2x+1}{3} > \frac{x-1}{2}$

v. $3x - 1 > \frac{2x}{3}$

(3). Solve the following inequalities.

i. $(x-1)(x-2) \geq 0$

ii. $(x+1)(x-1) \leq 0$

iii. $x^2 - x < 6$

iv. $2x^2 > x + 1$

v. $(x+4)(x-3) \geq x-3$

(4). Solve the following inequalities.

i. $(x-1)(x-2)(x-3) \geq 0$

ii. $(x+1)(2x-1)(x-4) \leq 0$

iii. $(2x+1)(x-3)(x+2) < 0$

iv. $(x-2)(x+2)(x-3)(x+3) > 0$

v. $x^3 + 6x^2 + 5x - 12 \geq 0$

vi. $2x^3 + x^2 - 5x + 2 \leq 0$

vii. $(x-2)^2(x+3)(x-1) < 0$

viii. $(x+1)^2(x-2)(x+3) \geq 0$

ix. $(x+2)^3(x+2)(x+1) < 0$

(5). Solve the following inequalities.

1. $(x+2)(x-1) > 0$

2. $(2x-1)(x+1) \leq 0$

3. $(x+2)(2x+3)(x-3) \geq 0$

4. $(2-x)(2x+3) > 0$

5. $(x-1)^2 > 9$

6. $(x+1)(x-2)(2x+1) \leq 0$

7. $(x-1)(x-2) \leq 6$

8. $x^2 > 3x$

9. $(3x+2)(x-2)(2x-1) > 0$

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

11. $x^2 - 2x + 5 > 0$

12. $(2x-1)(x+2)(x+1) < 0$

13. $12 - 4x < x^2$

14. $-x^2 - 4x - 3 < 0$

(6). Solve the following inequalities.

i. $\frac{(x-2)(x-3)}{(x-1)} < 0$

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

iii. $\frac{(x+1)(x^2-9)}{x(x+2)} \geq 0$

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

v. $\frac{(x-1)(x^2+x+3)}{(x+2)} > 0$

vi. $\frac{(x-2)(x^2-x-6)}{(x+1)^2} \geq 0$

$$vii. \frac{2x^2 + 5x + 7}{3x + 5} \geq 2$$

$$viii. \frac{2x^2 - 3x - 5}{x^2 + 2x + 6} > \frac{1}{2}$$

(7). Find the range of x of the following inequalities.

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

$$2. \frac{3x+4}{x} \leq 1$$

$$3. \frac{4-2x}{x} > 1$$

$$4. \frac{2x-4}{x-1} < 3$$

$$5. \frac{x-2}{x} < 1$$

$$6. \frac{x-1}{2+x} < 1$$

$$7. \frac{1}{x-3} < -1$$

$$8. \frac{3x+4}{x} \leq 1$$

$$9. \frac{4-2x}{x} > 1$$

$$10. \frac{2x-4}{x-1} < 3$$

$$11. \frac{x-2}{x} < 1$$

$$12. \frac{x-1}{2+x} < 1$$

(8). Find the range of x of the following.

$$1. \frac{3x-9}{x^2-x-2} \geq 0$$

$$2. \frac{2x^2-5x+2}{x-2} < 0$$

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

$$4. \frac{2x^2-9x+4}{x^2-4x+4} \leq 0$$

$$5. \frac{(x-1)(x-2)}{(x+1)(x-3)} < 0$$

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

$$7. \frac{(x+3)(x+4)}{(x+1)(x+8)} > \frac{1}{3}$$

$$8. \frac{1}{x+1} + \frac{2}{x+3} > \frac{3}{x+2}$$

(9). Solve the following inequalities.

$$1. 2x-1 < x^2-4 < 12$$

$$2. x-4 < x(x-4) < 5$$

$$3. x-3 > x^2-9 > -5$$

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

$$5. \frac{2}{x-1} < x < \frac{3}{x-2}$$

(10). Solve the following in equalities.

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

$$ii. 0 \leq 2x+4 \leq 3$$

$$iii. -1 \geq \frac{3-x}{2} > 2$$

$$iv. x+6 < x^2 < 9$$

$$v. (x-2) \leq x(x-2) < 15$$

$$vi. (x-1)(x-2) < (x-2)(x-3) \leq 20$$

(11). Solve the following inequalities.

$$i. 2 < \frac{1}{x-1} \leq 5$$

$$ii. -2 < \frac{5-3x}{x+1} < 4$$

$$iii. \frac{x+2}{x-3} > \frac{x}{x-2}$$

$$iv. \frac{1}{x} + \frac{1}{x+1} > \frac{1}{x+2}$$

$$v. -3 \leq \frac{(x-1)(x-5)}{(x-3)} \leq 3$$

$$vi. \frac{x}{x^2-1} - \frac{1}{(x+1)} \geq 2$$

$$vii. \frac{2x-3}{x^2-4} - \frac{1}{x-2} \leq \frac{x+1}{x+2}$$

(12). Find the range of x of the following.

1. $|x-3| > 4$ 2. $|x+2| \leq 1$ 3. $|2x+5| \geq 3$ 4. $|x-1| > |3x-2|$ 5. $|3-4x| < 3$
6. $|x+1| > 1$ 7. $|2+x| > |1+2x|$ 8. $|5-x| < |1+x|$ 9. $|3-2x| < |4+x|$ 10. $|x-1| > 3|x-2|$.

(13). Solve the following inequalities by using squaring method.

i. $|x+1| \geq |2x-1|$ ii. $|2x+1| > 3$ iii. $|x-2| \leq 5$ iv. $\left|\frac{x-3}{x+1}\right| < 2$ v. $x^2 < |x-2|$
vi. $|x+2| \geq |2x-5|$ vii. $|x-3| < |3x-4|$ viii. $|4x-3| > |x-1|$ ix. $|5x-2| < 3x$ x. $|2x+3| \leq 5x-1$

(14). Using the definition solve the following inequalities.

i. $|x+1| + |x-1| \leq 3$ ii. $|2x-5| - 3 \geq x+1$ iii. $3x - |2x+1| \geq 5$ iv. $6x - |4x+2| < 7$
v. $|x-2| + |x+1| < 6$ vi. $|x+4| - |x-1| < 2$ vii. $|x+2| + |x-1| < 2$ viii. $|x-3| + |x+2| > |3x|$
ix. $2 - |x+1| > |4x-3|$ x. $5 < |x+5| - |x-1|$

(15). Find the range of x which satisfies the following inequalities.

1. $x^2 > |5x+6|$ 2. $|5-3x| \geq 2-3x$ 3. $|2x-1| < 3x+5$ 4. $|5x-8| < 3x-2$
5. $7-x \geq 2|x^2-4|$ 6. $|3x-4| > 2-5x$ 7. $|x-8| > 8x$

(16). Find the range of x which satisfies the following inequalities.

1. $|x+5| \leq 3$ 2. $\left|2x + \frac{3}{5}\right| > 1$ 3. $2|x+2| \leq 3x-2$ 4. $|3x-2| > x-2$ 5. $|x+1| > |3x-5|$
6. $|x| < |x^2 - 7x + 6|$ 7. $2 - |x+1| \geq |4x-3|$ 8. $|x^2 - 1| - 1 < |3x-2|$ 9. $3 + |x+1| \leq x$
10. $|x-1| + |x+1| \leq 3$ 11. $|2x+3| \geq 2 - |x+3|$ 12. $|x+2| - |x+4| < x$

(17). Solve the following equations.

i. $|2x+1| = 13$ ii. $|3x-2| = 17$ iii. $|2x+3| + 5 = 10x-1$ iv. $3x+2 - |4x-3| = 8$
v. $6x = 8 - |4x-3|$ vi. $2x - |3x| = 1$ vii. $2x^2 + |5x| + 2 = 0$ viii. $2|2x-3| = |3x-4|$
ix. $x^2 - 3|x| - 4 = 0$ x. $2|4x+1| = 3|x+3|$

(18). Solve the following equations

1. $|3x+4| = 7$ 2. $\left|\frac{1}{x} - 3\right| = 4$ 3. $|x^2 - 5x + 3| = 3$ 4. $|2x+1| = |3x-4|$
5. $|x+2| = 2(3-x)$ 6. $|3x-2| + x = 11$ 7. $|x| = |x^2 - 2|$ 8. $2 - |x+1| = |4x-3|$

(19). Find the range of x which satisfies the following inequalities.

1. $x^2 - 5|x| + 6 < 0$ 2. $x^2 - |x| - 2 \geq 0$ 3. $x^2 - |5x-3| - x < 2$
4. $|x-6| > x^2 - 5x + 9$ 5. $x^2 - 7x + 12 < |x-4|$

(20) Sketch the graph of $y = |x|$. Hence sketch the following graphs.

1. $y = |x| + 1$

2. $y = |x| - 2$

3. $y = |x - 1|$

4. $y = |x + 2|$

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

6. $y = |x + 2| - 1$

7. $y = |x - 1| - 1$

8. $y = |x + 2| + 1$

(21). Sketch the graph of the following functions.

i. $y = |2x - 1|$

ii. $y = |2x + 1| + 2$

iii. $y = |5 - 2x|$

iv. $y = |2 - x| + 3$

v. $y = |2x| - 1$

vi. $y = 2 - |3x|$

vii. $y = 4 - |2x + 3|$

viii. $y = |2x - 3| - 4x$

ix. $y = 2|2x - 3| - 4x$

x. $y = 4x - |2x - 3|$

xi. $y = |2x| - x$

xii. $y = |x| + x$

(22). Sketch the graph of

1. $y = |x + 2| + 3$

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

3. $y = x - |x - 2|$

4. $y = |x - 1| + |x + 1|$

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

6. $y = |x^2 - 1|$

7. $y = |x^2 + 1|$

8. $y = |(x - 1)(x + 3)|$

9. $y = |x^2 + 3x - 4|$

10. $y = |2x + 3| - 4$

11. $y = |x^2 - x - 20|$

12. $y = |3x - 2| - x$

13. $y = x - 2|x + 1|$

14. $y = |x + 2| + |x - 2|$

15. $y = |x + 3| + |x - 2|$

16. $y = \frac{x}{2} - \frac{3}{2}|x + 1|$

(23). Sketch the graph of each of the following functions.

i. $y = |x - 1| + |x - 3|$

ii. $y = |x + 2| + |x - 4|$

iii. $y = |x - 1| + |x - 3| + |x - 5|$

iv. $y = x - 4 - 2|2x - 3|$

v. $y = ||x| - 1|$

vi. $y = ||x| - 1| - 2$

vii. $y = |2 - |x - 1||$

(24). Sketch the graph of $y = |x - 2|$. Hence sketch the following graphs.

i. $y = -|x - 2|$

ii. $y = 2 - |x - 2|$

iii. $y = -|x - 2| - 1$

(25) Sketch the graph of the following functions

1. $y = |x^2 - x - 6|$

2. $y = |-x^2 - 2x + 8|$

3. $y = |x^2 + 2x + 3|$

(26). Sketch the graphs of $y = |x - 2| + 2$ and $y = -|x - 1| + 4$ on the same diagram.

Hence find the range of x for $|x - 2| + |x - 1| \leq 2$

(27). Sketch the graphs of $y = |x - 2| + |x - 4|$ and $y = |x - 3| + 2$ on the same

diagram. Hence find x such that $|x - 3| - |x - 2| \geq |x - 4| - 2$

(28). Sketch the graph of $y = |x^2 - 8x + 12|$ and $y = |x^2 - 8x + 20|$ on the same diagram.

Hence find the solutions of $|x^2 - 8x + 20| \geq |x^2 - 8x + 12|$

(29). Sketch the graph of $y = |x^2 - 8x + 12|$ and $y = |x - 2|$ on the same

diagram. Hence find the solutions for which $|x^2 - 8x + 12| \leq |x - 2|$.

(30). Sketch the graph of $y = x^2 - 8x + 15$ Hence sketch the graph of $y = |x^2 - 8x + 15| - 1$. On the same diagram sketch the graph of $y = |x - 4|$. Hence find the set of values of x for $|x - 4| + 1 \geq |x^2 - 8x + 15|$. Deduce the value of l so that $|x - 4| + l \leq |x^2 - 8x + 15|$

(31). i. Sketch the graphs $y = |x + 2|$ and $y = 2x + 1$ on the same diagram.

Hence solve the inequality $|x + 2| > 2x + 1$

ii. Using purely algebraic method solve $|x + 2| > 2x + 1$

iii. Solve by using geometric method and algebraic method, $2|x| \leq |x - 3|$

(32). Sketch the graphs $y = 3 - |x + 2|$ and $y = |2x - 3x^2 + x^3|$ on the same diagram.

Hence shade the region $3 - |x + 2| \geq y \geq |2x - 3x^2 + x^3|$

(33) Sketch the graphs of the functions $y = |x - 4|$ and $2y = x$ on the same diagram. Hence,

1. Find the range of x for which $x > 2|x - 4|$

2. Solve $|x - 4| = \frac{x}{2}$

(34). Sketch the graph of the function $y = |x - 2| + x$ on the same set of axes sketch $y = |3x - 5|$. Hence

1. Find the range of x such that $|x - 2| + x > |3x - 5|$

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

(35). Sketch the graph of the function $y = |-x + 4| + 3|x - 1|$. Also sketch the graph of the function

$y = 5|x - 2| + 1$ on the same diagram Using the graphs

1. Find the solutions of $5|x - 2| + 1 = |-x + 4| + 3|x - 1|$

2. Find the range of x for which $5|x - 2| + 1 \geq |-x + 4| + 3|x - 1|$

(36). Sketch the graphs of the functions $y = |x - 8|$ and $y = 8x$ on the same diagram. Hence find the set of values of x which satisfies. $|x - 8| < 8x$. Solve the equation $|x - 8| = 8x$.

(37). Sketch the graphs of the function $y = 2|x + 1| - 3$ and $y = x + 2|x - 1|$ on the same pair of axes.

Hence find the set of values of x for which $x + 2|x - 1| > 2|x + 1| - 3$.

Solve the equation $x + 2|x - 1| = 2|x + 1| - 3$.

(38). Sketch the graphs of the functions $y = |3x - a|$ and $y = |bx - 2|$ on the same diagram. Where a and b are positive numbers. If the set of x which satisfies $|3x - a| < |bx - 2|$ is $\left\{x : x > \frac{4}{3}\right\}$ using the graphs or otherwise find a and b .

(39). Find the set, of real values of x , which satisfies the inequality $|x+2|+|x-1|>5$.

(40). Sketch the graphs of the functions $y=|x^2-2x-3|$ and $y=\left|\frac{x^2}{2}+3\right|$ on the same diagram.

Hence find the solutions of $|x^2-2x-3|=\left|\frac{x^2}{2}+3\right|$. Also find the range of x for which $\left|\frac{x^2}{2}+3\right|>|x^2-2x-3|$.

(41). On the same diagram sketch the graphs of $y=|2x-1|$ and $y=|x|+\frac{5}{3}$.

Hence, find the set of x such that $3|x|\geq|6x-3|-5$. For any $x\in\mathbb{R}$ sketch the graph of $y=|x|-k$ on the same diagram. Find for what value of l the equation $3|x|=|6x-3|+l$ has one real solution.

(42). Indicating clearly the fact you use draw graph of $y=x^2+2x-15$. Hence draw $y=|x^2+2x-15|$. On the same diagram draw the graph of $y=|2x+10|$. Hence or otherwise find the solution of $|x^2+2x-15|\leq|2x+10|$.

(43). Shade the following given regions in oxy -plane.

1. $3x+2y\leq 18, x+2y\leq 10, x\geq 0, y\geq 0$

2. $x-2y\leq 2, x+y\geq 3, -2x+y\leq 4, x\geq 0, y\geq 0$

3. $3x+4y\geq 12, 4x+7y\leq 28, y\geq 1, x\geq 0$

4. $2x+3y\leq 6, x+y\geq 2, y\geq 0, x\geq 0$

(44). Sketch the graphs of $y=|2x+3|-x$ and $y=|4x-3|+2x$ on the same diagram. Hence, find the x such that $|4x-3|-|2x+3|+3x\geq 0$.

(45). Sketch the graphs of $y=|2x-3|$ and $y=|x|-\frac{3}{2}$ on the same diagram. Hence, find the x such that

$$|2x|-|4x-6|<3.$$

(46). Sketch the graph of $y=-x^2+2x+8$. On the same diagram sketch the graph of $y=3|x+2|$.

Hence,

i. find a and b so that the equation $-x^2+2x+8=3|x+a|+b$ to have the solutions $x=4$ and $x=-2$.

ii. find l and m so that the equations $-x^2+2x+8=3|x+l|+m$ to have the coincident root $x=1$

(47). The set of real values of x that satisfy the inequality $|l-5x|<|kx-3|$, where l and k are real positive constants

is $\left\{x/-2 < x < \frac{4}{9}\right\}$. Sketch the graphs of $y=|l-5x|$ and $y=|kx-3|$ on the same figure and find the values of l and k .

(48). Sketch the graphs of $y = |x - a|$ and $y = b|x - 1|$ on the same diagram. Here $a > b > 0$ and $b \neq 1$. Hence, if the set of real values of x that satisfies the inequality $b|x - 1| > |x - a|$ is $\{x: 3 < x < 7\}$, find the values of a and b .

(49). Sketch the graphs of $y = 2|x + 1|$ and $y = 2 - |x|$ in the same diagram.

Hence or otherwise, find all real values of x satisfying the inequality $2|x + 2| + |x| \leq 4$

(50). Sketch in the same diagram the graphs of $y = \frac{1}{2}|x - 1|$ and $y = |x| - 1$. Hence or otherwise find all real values of x

which satisfy the inequality $\left|x - \frac{1}{2}\right| > |2x| - 1$.

(51). Sketch the graphs of $y = |(1 - x)(2 - x)|$ and $y = 2(1 - x)$ on the same plane. Hence solve the inequality

$$|(1 - x)(2 - x)| > 2(1 - x).$$

(52). In the same diagram sketch the graphs of $y = 3|2x - 1|$ and $y = 3 - 2|x|$.

Hence or otherwise find all real values of x , satisfying $|6x - 1| < 1 - 2|x|$

(53). Find the set of all values of x satisfying the inequality $2|x - 3| \leq 2 + x$.

Hence, solve $2|x + 3| \leq 2 - x$

(54). Using graphs solve the inequality $|3x - 1| > x + 3$. **Hence or otherwise**, find the range of the values of x which satisfies the inequality $|3x + 5| > x + 5$.

(55). Sketch the graphs of $y = 3|x - 1|$ and $y = |x| + 3$ in the same diagram.

Hence or otherwise, find all real values of x satisfying the inequality $3|2x - 1| > 2|x| + 3$.

(56). Sketch the graphs of $y = |4x - 3|$ and $y = 3 - 2|x|$ in the same diagram.

Hence or otherwise, find all real values of x satisfying the inequality $|2x - 3| + |x| < 3$.

(57). Draw the rough sketch of the graph $y = |x| - 1$. Hence draw the graph of $y = ||x| - 1|$ in another diagram. In the second diagram draw the graph of $y = 1$ and hence find all the possible range of real values of x satisfying $|x| \geq 2$.

(58). Draw the rough sketches of the graphs $y = |x - 3|$ and $y = |2x - 3|$ on the same diagram. Hence, find all real values of x satisfying the inequality $|x| > |2x + 3|$

(59). Sketch the graphs of the functions $y = 4 - |x + 1|$ and $y = |x - 2|$ on the same diagram. Hence or otherwise find all real values of x satisfying the inequality $|x + 1| + |x - 2| < 4$

(60). Sketch the graphs of $y = 3 - |x|$ and $y = |x - 1|$ in the same diagram.

Hence or otherwise, find all real values of x satisfying the inequality $|x| + |x - 1| \leq 3$.

**Join 2026 Combined Maths Telegram Group Using The Following
QR Code.**

