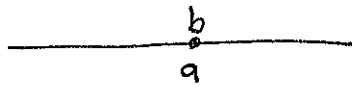


§ 1.2 - Linear Inequality

Recall: let a, b be two real numbers.

$$a = b$$



inequality symbol $a < b$

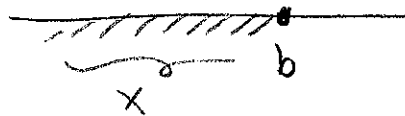


$$a > b$$

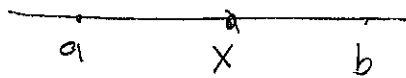


$$x \leq b$$

$$x < b \quad \text{or} \quad x = b$$



$$a < x < b$$



Definition:

An inequality that joins two expressions with an inequality sign (either $<$, $>$, \leq , \geq , ...).

* Rules of Inequality

(1) If $A < B$, then $A \pm c \leq A \pm c$.

(2) If $A \leq B$, then $c \cdot A < c \cdot B$ if $c > 0$

$c \cdot A > c \cdot B$ if $c < 0$

To solve inequality in x , try to isolate x using these two rules. 1

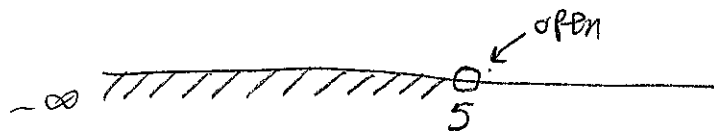
Example 1: solve $2(x-3) < 4$.

$$2x - 6 < 4$$

$$2x < 4 + 6$$

$$2x < 10$$

$$\boxed{x < 5}$$



--- number line

$$\text{open} \rightarrow (-\infty, 5) \leftarrow \text{open}$$

--- Interval.

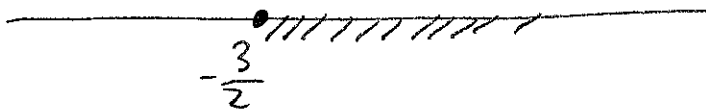
Exercise 1: solve $3 < 2x + 3$.

Example 2: solve $3 - 2x \leq 6$

$$-2x \leq 6 - 3$$

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

$$x \geq \frac{3}{-2}$$



$$\text{closed} \rightarrow \left[\frac{3}{2}, \infty \right)$$

Exercise 2: solve $-3 \geq 8(2-x)$.

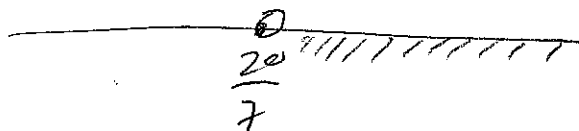
Example 3: Solve $\frac{3}{2}(x-2)+1 > -2(x-4)$

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

$$3x-6+2 > -4x+16$$

$$7x-4 > +16$$

$$7x > 20 \rightarrow x > \frac{20}{7}$$



$$\left(\frac{20}{7}, \infty\right)$$

Example 4:

$$2(x-2) > 2x+6$$

$$2x-4 > 2x+6$$

$-4 > 6$!! Can't be the case so

No solution!

Example 5: solve

$$2x+6 < 2(x+5)$$

$$2x+6 < 2x+10$$

$$6 < 10 \quad \text{always true}$$

so all the real numbers

$$(-\infty, \infty)$$

are solution

