

Order of Real Numbers

Let a and b be any two real numbers.

Symbol	Definition	Read
$a > b$	$a - b$ is positive	a is greater than b
$a < b$	$a - b$ is negative	a is less than b
$a \geq b$	$a - b$ is positive or zero	a is greater than or equal to b
$a \leq b$	$a - b$ is negative or zero	a is less than or equal to b

The symbols $>$, $<$, \geq , and \leq are **inequality symbols**.

WRITE IT DOWN!

Bounded Intervals of Real Numbers

Let a and b be real numbers with $a < b$.

Interval Notation

Inequality Notation

$[a, b]$

$a \leq x \leq b$

(a, b)

$a < x < b$

$[a, b)$

$a \leq x < b$

$(a, b]$

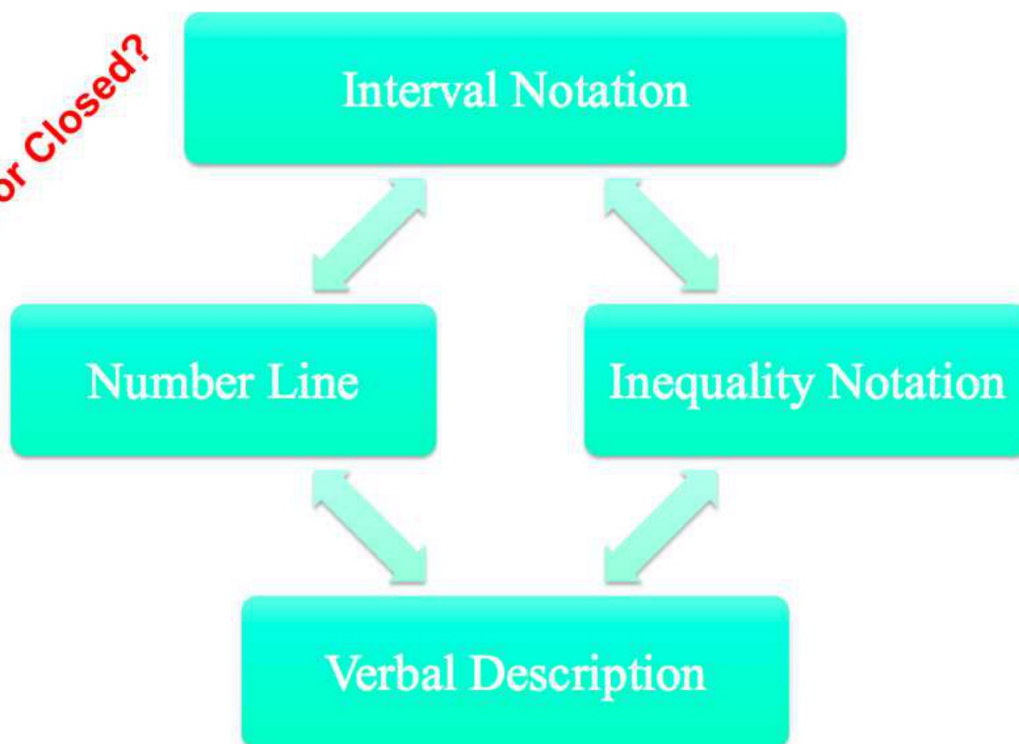
$a < x \leq b$

The numbers a and b are the right and left **endpoints** of each interval.

Equivalent

Equivalent Representations for Intervals of Real Numbers

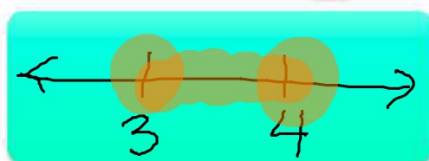
Open or Closed?



Four Representations: Intervals of Real Numbers

Open or Closed?

$$[3, 4]$$



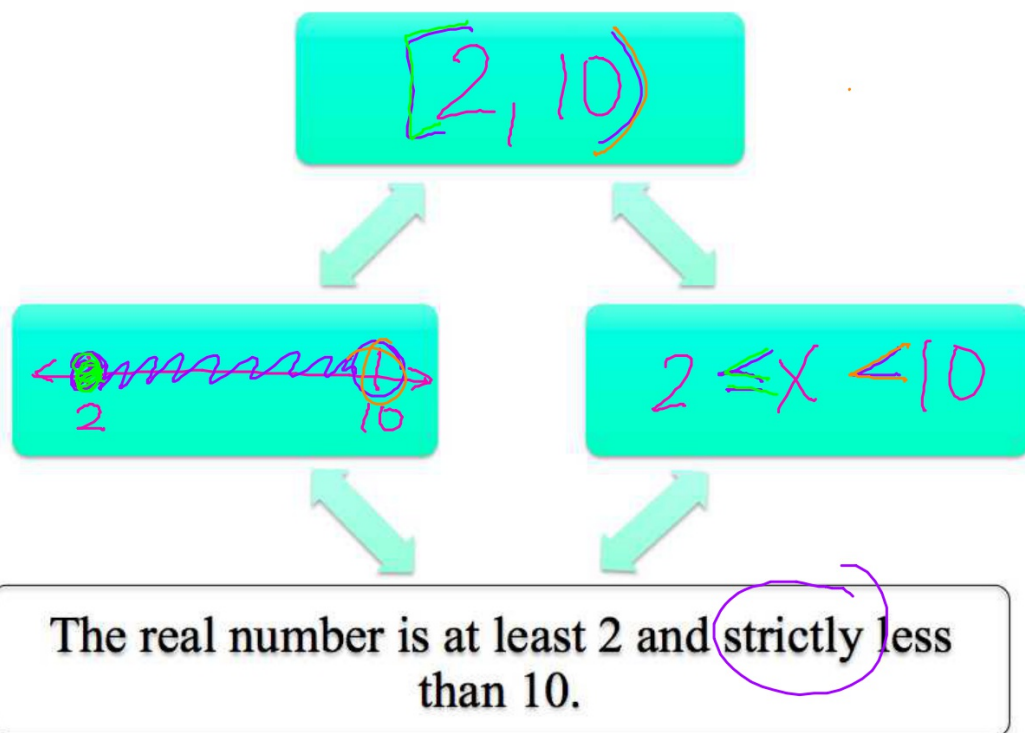
$$3 \leq x \leq 4$$

The real number x is greater than or equal to 3 and less than or equal to 4.

at least

at most

Four Representations: Intervals of Real Numbers



WRITE IT
DOWN!

Unbounded Intervals of Real Numbers

Let a and b be real numbers.

Interval Notation

Inequality Notation

$$[a, \infty)$$

$$x \geq a$$

$$(a, \infty)$$

$$x > a$$

$$(-\infty, b]$$

$$x \leq b$$

$$(-\infty, b)$$

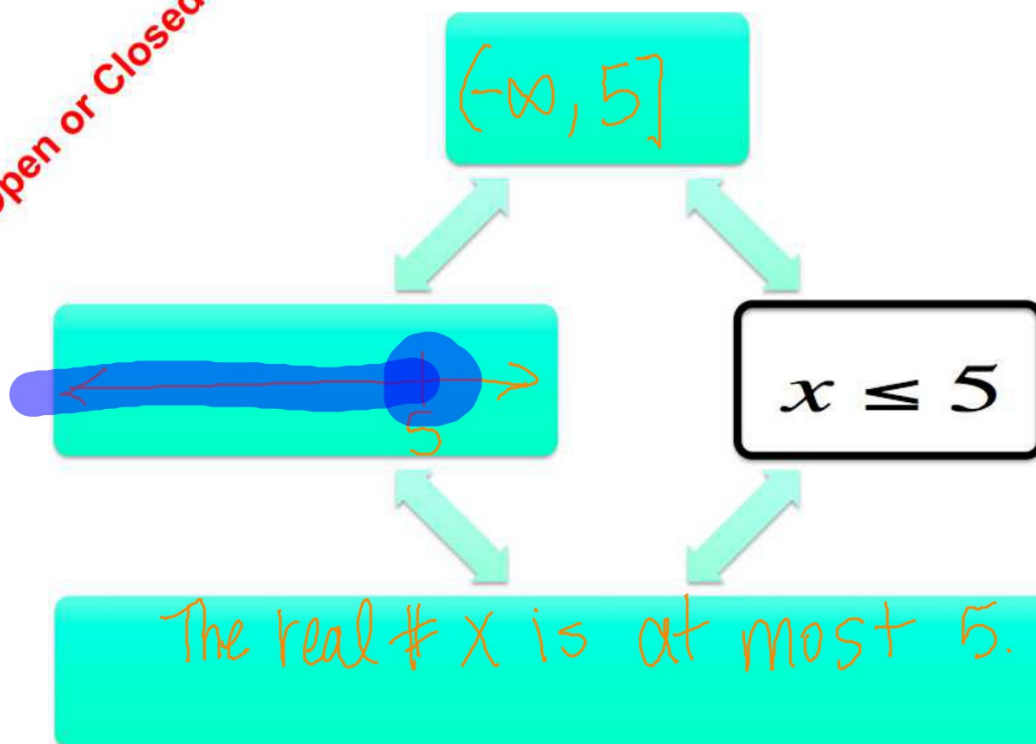
$$x < b$$

HINT: STANDARD FORM
FOR INEQUALITY NOTATION
BEGINS WITH "x is"

Each of these intervals has exactly one endpoint, namely a or b .

Four Representations: Intervals of Real Numbers

Open or Closed?



AM: Solve Linear Inequalities

LCD
Isolate
Simplify

1. Solve: $5x - 8x + 13 > 5x - (16 - 7x)$

[A] $x < \frac{29}{15}$

[B] $x < -\frac{29}{9}$

[C] $x > \frac{29}{15}$

[D] $x > -\frac{29}{9}$

$$5x - 8x + 13 > 5x - 16 + 7x$$

$$-3x + 13 > 12x - 16$$

$$-12x - 13 \quad -12x - 13$$

$$\frac{-15x}{-15} > \frac{-29}{-15}$$

$$x < \frac{29}{15}$$

$$\frac{29}{15} > x$$

AM: Solve Linear Inequalities

2. If the replacement set is the set of integers, find the solution set for the inequality $x + 11 \geq 12$.

☒ [A] $\{1, 2, 3, \dots\}$ ☒ [B] $\{1\}$ ☒ [C] $\{23, 24, 25, \dots\}$ ☒ [D] $\{-1, 0, 1, \dots\}$

$$\begin{array}{r} x + 11 \geq 12 \\ -11 \quad -11 \\ \hline x \geq 1 \end{array}$$

$$\begin{array}{r} x > 1 \\ \{2, 3, 4, \dots\} \end{array}$$