Interval Notation Supplement

Inequality	Interval Natation	Set-Builder Notation	Number Line Graph
$a < x < b$	(a,b)	$\{x \mid a < x < b\}$	$-\infty$ ←—(===)—→ ∞ (open a, open b)
$a \le x \le b$	$[a,b]$	$\{x \mid a \le x \le b\}$	$-\infty$ ←—[===]—→ ∞ (closed a, closed b)
$a \le x < b$	$[a,b)$	$\{x \mid a \le x < b\}$	$-\infty$ ←—[===)—→ ∞ (closed a, open b)
$a < x \le b$	$(a,b]$	$\{x \mid a < x \le b\}$	$-\infty$ ←—(===]—→ ∞ (open a, closed b)
$a < x$	(a,∞)	$\{x \mid a < x\}$	$-\infty$ ←—(====→ ∞ (open a)
$a \le x$	$[a,\infty)$	$\{x \mid a \le x\}$	$-\infty$ ←—[====→ ∞ (closed a)
$b > x$	$(-\infty,b)$	$\{x \mid b > x\}$	$-\infty$ ←====)—→ ∞ (open b)
$b \ge x$	$(-\infty,b]$	$\{x \mid b \ge x\}$	$-\infty$ ←====]—→ ∞ (closed b)
$x < a$ or $x > b$	$(-\infty,a) \cup (b,\infty)$	$\{x \mid x < a \text{ or } x > b\}$	$-\infty$ ←==) (==→ ∞ (open a, open b)
$x \le a$ or $x \ge b$	$(-\infty,a] \cup [b,\infty)$	$\{x \mid x \le a \text{ or } x \ge b\}$	$-\infty$ ←==] [==→ ∞ (closed a, closed b)
$x \le a$ or $x > b$	$(-\infty,a] \cup (b,\infty)$	$\{x \mid x \le a \text{ or } x > b\}$	$-\infty$ ←==] (==→ ∞ (closed a, open b)
$x < a$ or $x \ge b$	$(-\infty,a) \cup [b,\infty)$	$\{x \mid x < a \text{ or } x \ge b\}$	$-\infty$ ←==) [==→ ∞ (open a, closed b)
All Real Numbers	$(-\infty,\infty)$		$-\infty$ ←=======→ ∞

Note that on the graph [and] are the same as •, and (and) are the same as ○. The parentheses and brackets are used on the number line (in part) to make the transition to interval notation easier.

The symbol ∪ represents the union of two (or more) sets. It is used to combine two (or more) intervals together to make a single set. For example: (−9, −3)∪[2, 5) means that you have the interval (−9, −3) _and_ the interval [2, 5).