Intervals

INEQUALITIES
$<$ *Less than*
$\leq$ *Less then or Equal to*
$>$ *Greater than*
$\geq$ *Greater than or Equal to*

The terms "less than or equal to" and "greater than or equal to" allow for the number to be included.
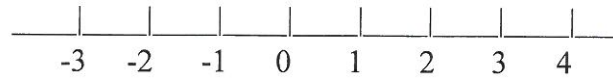
$x < 3$	x is less than 3 Includes all numbers less than 3 3 is excluded
$x \leq 3$	x is less than or equal to 3 Includes all numbers less than 3 3 is included
$x > 5$	x is greater than 5 Includes all numbers greater than 5 5 is excluded
$x \geq 5$	x is greater than or equal to 5 Includes all numbers greater than 5 5 is included

$x > 3$ $x \leq 5$	
The two statements above can be combined to make one statement	
$3 < x \leq 5$	Includes all numbers between 3 and 5 3 is not included 5 is included

Number Line

Included/Excluded

● = included	
○ = excluded	

```
    |    |    |    |    |    |    |    |
   -3   -2   -1    0    1    2    3    4
```

Examples:

$x < 2$

```
◄────────────────────○────
    |    |    |    |    |    |    |    |
   -3   -2   -1    0    1    2    3    4
```

$x \leq 2$

```
◄────────────────────●────
    |    |    |    |    |    |    |    |
   -3   -2   -1    0    1    2    3    4
```

$x > -1$

```
            ○────────────────►
    |    |    |    |    |    |    |    |
   -3   -2   -1    0    1    2    3    4
```

$x \geq -1$

```
            ●────────────────►
    |    |    |    |    |    |    |    |
   -3   -2   -1    0    1    2    3    4
```

$-1 < x \leq 2$

```
            ○──────────●
    |    |    |    |    |    |    |    |
   -3   -2   -1    0    1    2    3    4
```
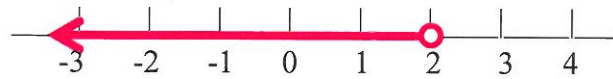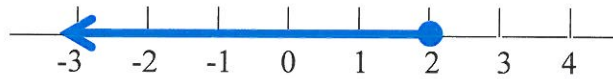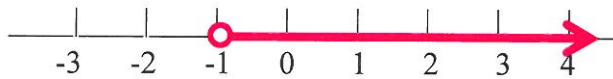
Brackets

We use square brackets. Infinity, positive or negative, cannot be included in the interval.

Included = the bracket hugs the number

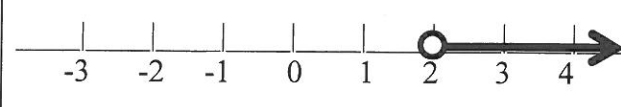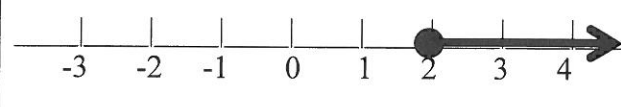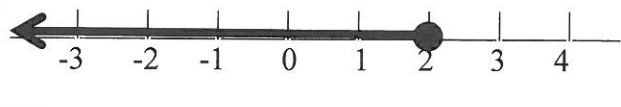**Excluded** = the bracket turns its back to the number
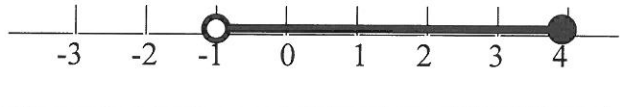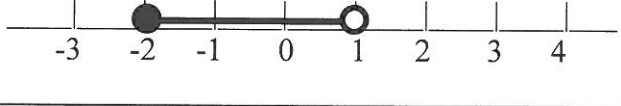
[a,b]   ]a,b[

[a,b[   ]a,b]

Examples:

$x > 3$	]3, +∞[
$x < 3$	]-∞, 3[
$x \geq 3$	[3, +∞[
$x \leq 3$	]-∞, 3]
$-2 \leq x < 1$	[-2,1[

Examples: intervals being expressed using different notation.

$x > 2$		$]2, +\infty[$
$x \geq 2$		$[2, +\infty[$
$x < 2$		$]-\infty, 2[$
$x \leq 2$		$]-\infty, 2]$
$-1 < x \leq 4$		$]-1, 4]$
$-2 \leq x < 1$		$[-2, 1]$