Chapter 3-6
Compound Inequalities

Part 2:

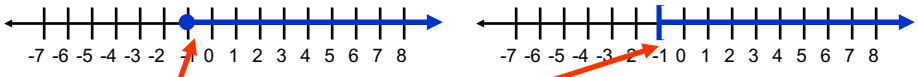
Inequality Notation

verses

Interval Notation

There are two kinds of notation for graphs of inequalities: open/closed circle notation (inequality notation) and interval notation brackets.

$$x \geq -1$$



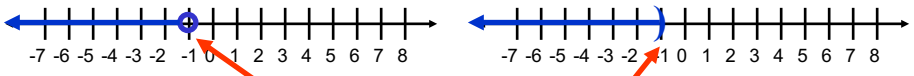
Closed circle

Squared end bracket

Because the inequality is "greater than **or equal to**" the solution includes the endpoint. That's why the circle is filled in. With interval notation brackets, a square bracket means it includes the endpoint.

Let's look at the two different notations with a different inequality sign.

$$x < -1$$

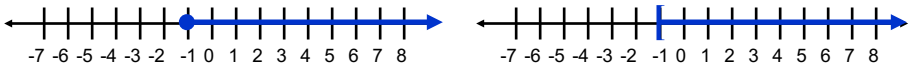


Open circle

Rounded end bracket

Since this says "less than" we make the arrow go the other way. Since it doesn't say "***or equal to***" the solution **cannot** equal the endpoint. That's why the circle is **open**. With interval notation brackets, a rounded bracket means it **cannot** equal the endpoint.

Graphically there are two different notations, and when you write your answers you can use inequality notation or interval notation. You should be familiar with both.



$$x \geq -1$$

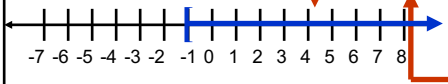
Inequality notation for graphs shown above.

$$[-1, \infty)$$

Interval notation for graphs shown above.

Let's have a look at the interval notation.

$[-1, \infty)$



For interval notation you list the left endpoint, a comma, and then the right endpoint. So the solutions are any numbers that are between the left and right endpoints.

The bracket after the infinity sign is rounded because **infinity is not a real number** and so the solution does not include the endpoint (there is no endpoint).

Let's try another one.

Rounded bracket means cannot equal -2

$(-2, 4]$

Squared bracket means can equal 4

The brackets used in the interval notation above are the same ones used when you graph this.

This means everything between –2 and 4 but **not** including -2

Let's look at another one

$(-\infty, 4)$

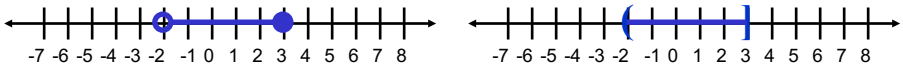
This means x is unbounded below

This means the largest that x can be is 4 but can't equal 4

Compound Inequalities

Let's consider a compound inequality

$$-2 < x \leq 3$$

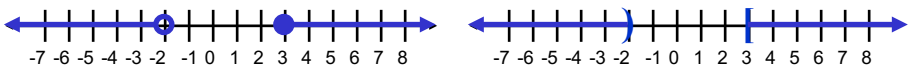


This is a ***compound*** inequality because it is a combination of two inequalities. It reads that "x is greater than –2 **and** x is less than or equal to 3". The word "and" means both parts **must** be true.

Compound Inequalities

Now let's look at another one…

$$x < -2 \quad or \quad x \geq 3$$



Instead of "and", these are "**or**" problems. One part **or** the other part must be true (but not necessarily both). Either "x is less than –2 **or** x is greater than or equal to 3". (In this case both parts cannot be true at the same time since a number can't be less than –2 and also greater than 3).