Interval Notations and Examples

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When we look at the problem facing a household, we often have to restrict the choice set for example to an interval.

Closed Interval

For example, if *x* is hours working, perhaps the household has to work at least *a* hours and up to *b* hours, so his choice is between *a* and *b* hours inclusive.

The interval that is inclusive of both endpoints is called a closed interval (note the square brackets):

- **closed interval**: $[a,b] \equiv \{x \in \mathbf{R} : a \leq x \leq b\}$

Open Interval

In general, an open interval is defined as (Note here we use parenthesis, not square brackest) :

- **open interval**: $(a,b) \equiv \{x \in \mathbf{R} : a < x < b\}$

Half Open and Half Close Interval

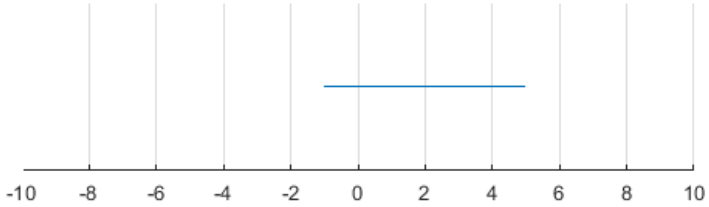
We can also hafl half open intervals:

- **half open (half closed) interval**: $[a,b) \equiv \{x \in \mathbf{R} : a \leq x < b\}$
- **half open (half closed) interval**: $(a,b] \equiv \{x \in \mathbf{R} : a < x \leq b\}$

Graph

If you were to graph an interval, you can draw an empty circle at either end of an interval that is open, and a solid circle if it is closed at that end.

```
close all;
figure();
x = linspace(-1,5);
line(x,0*ones(size(x)))
set(gca,'ytick',[],'Ycolor','w','box','off')
ylim([-0.1 0.1])
xlim([-10  10])
pbaspect([4 1 1])
grid on
```


-10
-8
-6
-4
-2
0
2
4
6
8
10