

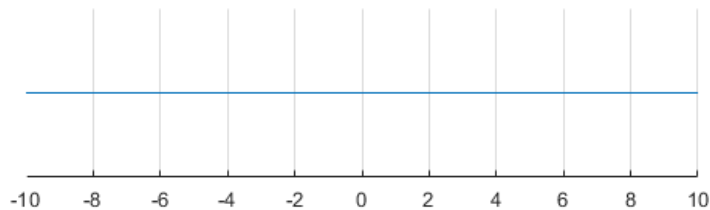
# Real Number and intervals

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## Real Number Line

$\mathbf{R}^1$  : can write  $\mathbf{R}^1$  or  $\mathbf{R}$  (you can add a superscript 1 to emphasize this is first Euclidean space, either notation is fine), is the real number line.

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



## Non-negative numbers

In many economic problems, we have to restrict ourselves to numbers greater or equal to zero.

- We can not consume from negative numbers of apples
- We can not produce with negative labor and capital
- We would be infinitely unhappy (die) if there is zero consumption in a year

We can use the following notation to define the set of non-negative real numbers:

$\mathbf{R}_{\geq 0} \equiv \{x \in \mathbf{R} : x \geq 0\}$ , some authors use  $\mathbf{R}_+$  instead of  $\mathbf{R}_{\geq 0}$

And use inequality sign to define the set of real numbers greater than zero:

$\mathbf{R}_{>0} \equiv \{x \in \mathbf{R} : x > 0\}$ , some authors use  $\mathbf{R}_{++}$  instead of  $\mathbf{R}_{>0}$

```
close all;  
figure();  
x = linspace(0,10);  
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
```

