Basic R

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When typing following codes in R console, do not type the R prompt >

1. R is case-sensitive

```
> a = 5
> A
Error: object 'A' not found
> a
[1] 5
```

2. Single equal sign does assignment; double equal signs do evaluation and return logical values TRUE/FALSE

```
> a==4
[1] FALSE
> a==5
[1] TRUE
```

3. FALSE is represented by 0, called Boolean value; TRUE is represented by 1

```
> as.numeric(a==4)
[1] 0
> as.numeric(a==5)
[1] 1
> (a==5)+3
[1] 4
```

4. Parenthesis is for function

```
> sqrt(a)
[1] 2.236068
> a()
Error in a() : could not find function "a"
```

5. Functions can be nested, something like $f(g(x))$ you learn in algebra class (called composite functions). A common mistake occurs when the left and right parentheses do not match.

```
> log(sqrt(a))
[1] 0.804719
```

6. Some functions require multiple arguments (inputs) separated by comma

```
> pt(2,df=10)
[1] 0.963306
> args(pt)
function (q, df, ncp, lower.tail = TRUE, log.p = FALSE)
```

   To learn more about the pt function, type in console window

```
? pt()
```

7. Function c combines something together and create a vector

```
> vector = c(2,6,-3,7)
> vector
[1]  2  6 -3  7
> which(vector==7)
[1] 4
> which(vector>3)
[1] 2 4
> length(vector)
[1] 4
```

8. Brackets do subsetting, also called indexing or selection

```
> vector[3]
[1] -3
> vector[2:4]
[1]  6 -3  7
```

```
> vector[c(2,4)]
[1] 6 7
> vector[vector>3]
[1] 6 7
```

9. Quotations are for character (letter, string...)

```
> vectorb = c("Trump", "Biden")
> vectorb
[1] "Trump" "Biden"
> vectorb[2]
[1] "Biden"
> class(vectorb)
[1] "character"
> class(vector)
[1] "numeric"
```

10. dollar sign does selection for a list

```
> lista = list(p=3,q=9)
> lista
$p
[1] 3
$q
[1] 9
> lista$p
[1] 3
```

11. Data frame combines string and numeric values together

```
> name = c("tom", "jerry","jack")
> age = c(3,8,1)
```

```
> data = data.frame(name,age)
> data
   name age
1   tom   3
2 jerry   8
3  jack   1
> data[3,]
  name age
3 jack   1
> data[,2]
[1] 3 8 1
> data[2,2]
[1] 8
> ls(data)
[1] "age"  "name"
> str(data)
'data.frame': 3 obs. of  2 variables:
 $ name: chr  "tom" "jerry" "jack"
 $ age : num  3 8 1
 > data$name
[1] "tom"   "jerry" "jack"
> data$name[3]
[1] "jack"
```

12. Chatgpt can answer a lot of questions about R. For instance, try these questions

```
In R, how to extract the second column of a data frame
In R, how to know whether a variable is numeric or character
In R, how to know the location of a value in a vector
In R, how to know whether a variable has missing values
In R, how to use the third column to sort a data frame
```

The last two questions are relevant for eco 311 project. In the AI era, an important skill is knowing how to ask Chatgpt clear and specific questions