

Week 1 Exercises

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Exercise 1 - Variables

a) Write an expression to compute the sum of the numbers 3 and 4

```
sum(3, 4)
```

```
## [1] 7
```

b) Write an expression to determine if the product of 4 and 5 is equal to 21

```
prod(4, 5) == 21
```

```
## [1] FALSE
```

c) Create the variables x, y, z with values (respectively) 2, 3.5, 7

```
x <- 2  
y <- 3.5  
z <- 7
```

d) Exploit a function of R to investigate the datatype of the three variables x, y, z

```
typeof(x)
```

```
## [1] "double"
```

```
typeof(y)
```

```
## [1] "double"
```

```
typeof(z)
```

```
## [1] "double"
```

e) Write an expression to compute the multiplication of the three variables x, y, z

```
prod(x, y, z)
```

```
## [1] 49
```

f) Write a Boolean expression (i.e., which result is T or F) which checks if the product of x, y, z is equal to 49

```
prod(x, y, z) == 49
```

```
## [1] TRUE
```

g) Create a variable s with value “Alexander”

```
s <- "Alexander"
```

h) Look for a function returning the length of a string and use it to determine the length of s

```
nchar(s)
```

```
## [1] 9
```

Exercise 2 - Vectors

a) Create a variable ?? (a vector) with the value 1: 10

```
x <- 1:10
```

b) How can you investigate the length of ???

```
length(x)
```

```
## [1] 10
```

c) Multiply x by the number 1.2

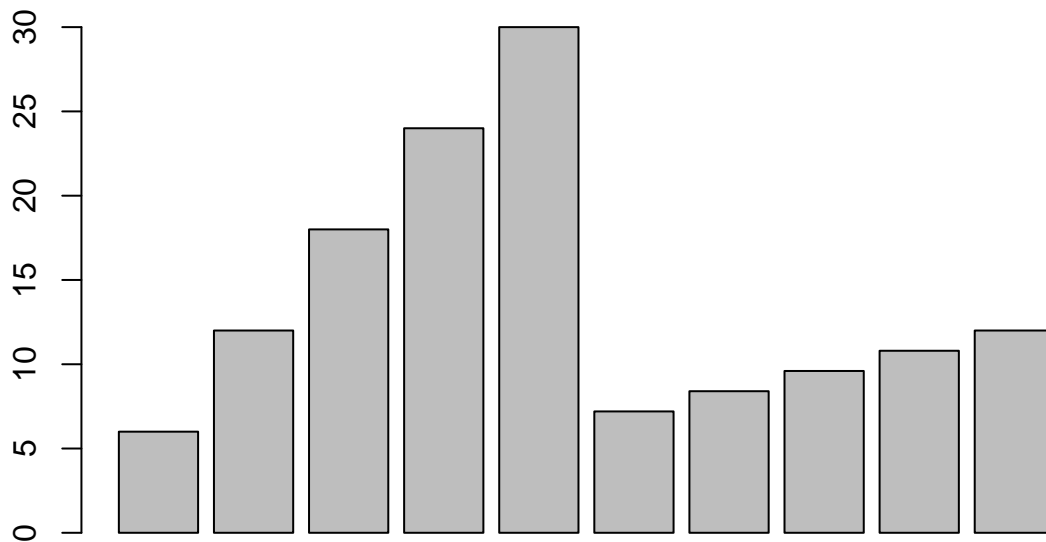
```
x <- x*1.2
```

d) Multiply the first five elements of x by 2

```
x[1:5] <- x[1:5] * 2
```

e) Visualize x using `barplot(x)`

```
barplot(x)
```

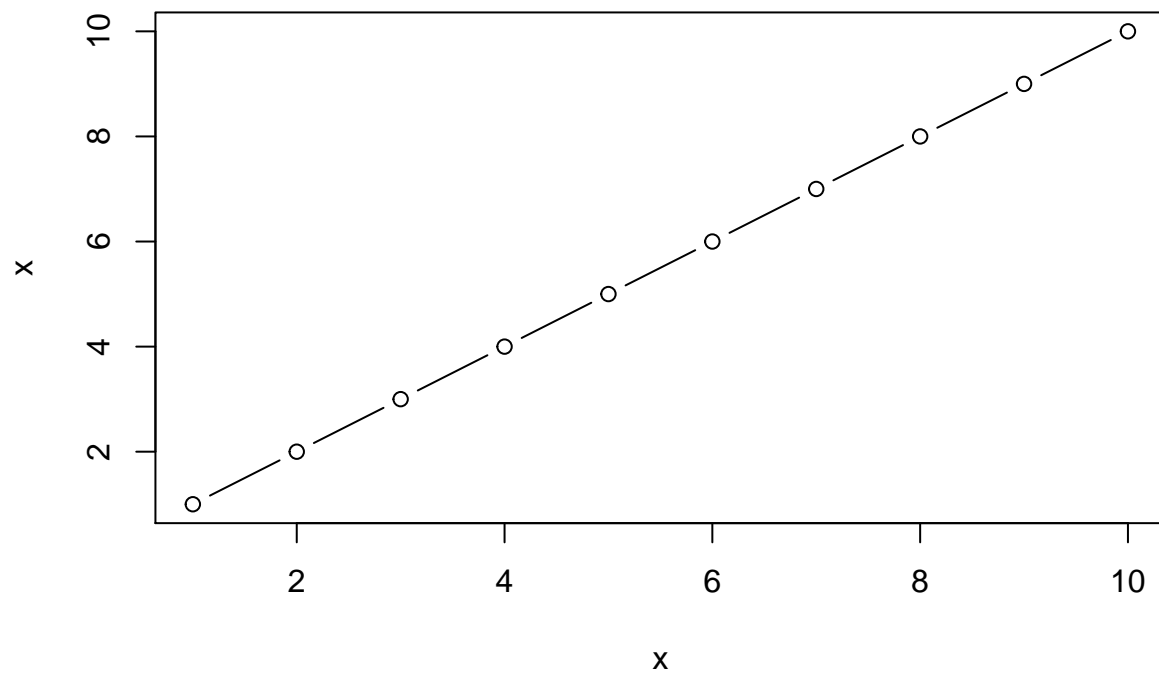


f) Assign to x the values of all integers from 0 to 10

```
x <- 1:10
```

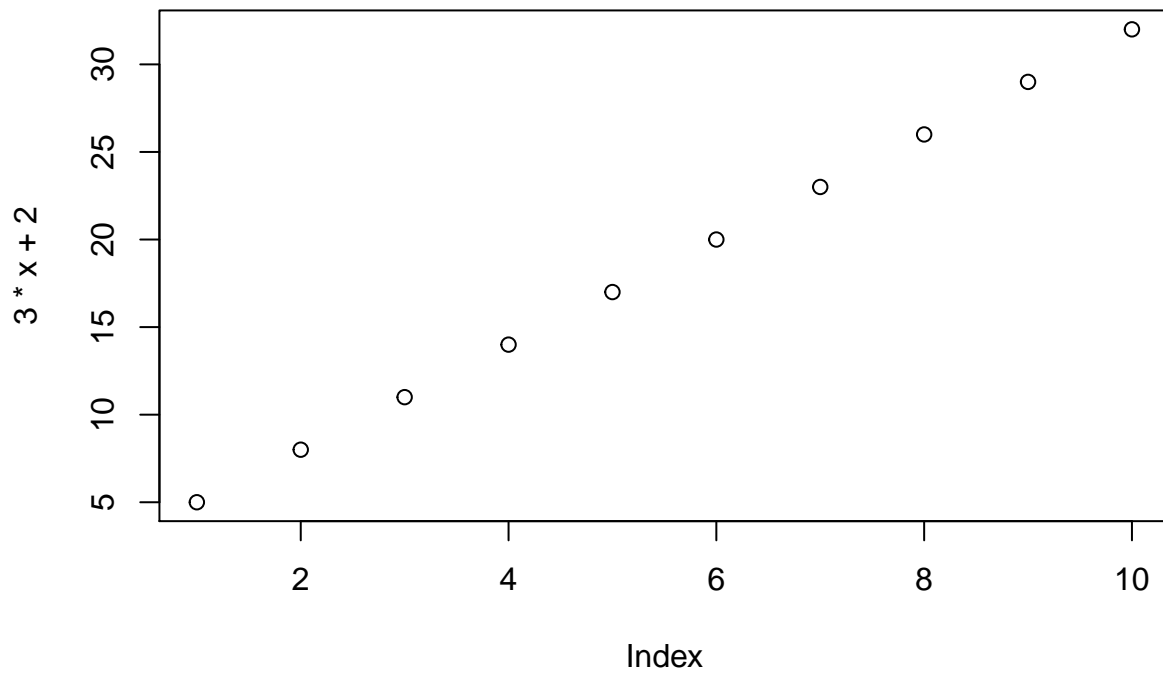
g) Create a graph of x against x using `plot(x,x,type = "b")`

```
plot(x,x,type= "b")
```



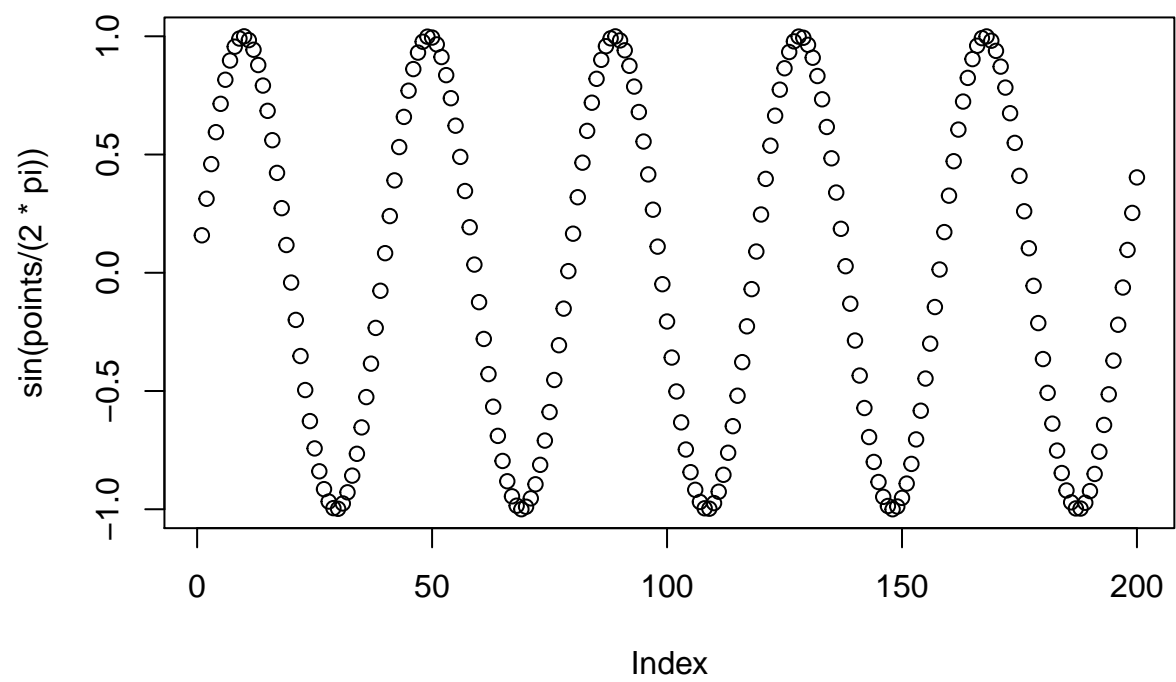
h) Use `plot` to draw the graph of the function $y = 3x + 2$ for values of x between 0 and 10

```
plot(3*x+2)
```



i) Use `plot` to draw the graph of the function $y = \sin(x)$ for values of x between 0 and 2π (use at least 200 points)

```
points <- 1:200  
plot(sin(points / (2 * pi)))
```



j)