1. Vectors

What is the output of the following commands? Try to predict the solutions before you type in the commands.

```
x <- c(5,2,1,4); xx <- c(1,10,15,18); y <- rep(1,5)

z <- c(TRUE,FALSE,TRUE,TRUE); w <- c("Marie","Betty","Peter")
```

a) sum(x)
   range(x)
   length(y)
   sum(y)

b) c(x,y,13)

c) xx - x
   c(x,12) *
   y 1:6 + 1
   1:9 + 1:2

d) x <= 2
   x <= 2 & z

e) substring(w,2,4)
   paste(substring(w,1,2),substring(w,5,5),sep=
   "..")

f) cbind(x,xx)
   cbind(2,6:1, rep(c(3,1,4),2), seq(1.1,1.6,by=0.1))

2. Sequences of Numbers

Create the following sequences. Use the commands rep and seq.

a) 1 2 3 4 5 6 7 8 9

b) "m" "w" "m" "w" "m" "w" "m" "w" "m" "w"

c) 1 2 3 4 1 2 3 4 1 2 3 4

d) 4 4 4 3 3 3 2 2 2 1 1 1
   Hint: Use argument each of the function rep.

e) 1 2 2 3 3 3 4 4 4 4 5 5 5 5 5

f) 1 1 3 3 5 5 7 7 9 9 11 11

3. Matrices.

a) Generate the following matrices.

```
     [,1] [,2] [,3] [,4]
[1,]    1  101  201301
[2,]    2  102  202302
```

```
[3,]    3 103 203303
[4,]    4 104 204304
[5,]    5 105 205305
```

	[,1]	[,2]	[,3]	[,4]	[,5]	[,6]	[,7]	[,8]	[,9]	[,10]
[1,]	5	0	0	0	0	0	0	0	0	0
[2,]	0	5	0	0	0	0	0	0	0	0
[3,]	0	0	5	0	0	0	0	0	0	0
[4,]	0	0	0	5	0	0	0	0	0	0
[5,]	0	0	0	0	5	0	0	0	0	0
[6,]	0	0	0	0	0	5	0	0	0	0
[7,]	0	0	0	0	0	0	5	0	0	0
[8,]	0	0	0	0	0	0	0	5	0	0
[9,]	0	0	0	0	0	0	0	0	5	0
[10,]	0	0	0	0	0	0	0	0	0	5

b) Explore the properties of your generated objects. Which class of R-objects do they belong to? How are they structured?
Hint: class(), dim(), str(), summary().