

## Some R commands

Understand what all of the commands below do and be able to say exactly what the outcome of each command would be when applied. Also, be able to evaluate combinations of commands: for example,

```
x = c(4,2,5,5,2)
cumsum(sort(unique(x)))
```

### Calculations

```
factorial(6)
choose(10,4)
```

### Creating vectors

```
c(1,4,3,1,2)
seq(0,1,.1)
3:20
8:3
rep(5,10)
rep(1:3,4)
rep(1:3,c(2,5,1))
```

### Putting vectors together:

```
x = c(1,5,4)
y = c(3,6)
c(x,y)
c(x,8:10,y)
c(rep(3,4),rep(1:2,2))
```

### Vector arithmetic:

```
x = c(1,5,4)
y = c(3,2,1)
x^2
x-y
3*x-y
x*y
x/y
x^y
```

### Functions of a single value (or a vector):

```
ceiling(x)
floor(x)
abs(x)
sqrt(x)
log(x)
log10(x)
exp(x)
```

### Functions specifically for vectors:

```
length(x)
sum(x)
cumsum(x)
prod(x)
cumprod(x)
sort(x)
unique(x)
duplicated(x)
diff(x)
min(x)
max(x)
mean(x)
```

### median(x)

```
table(x)
var(x)
sd(x)
```

### Functions of two or more vectors

```
x = c(1,2,8,7)
y = c(3,2,1,4)
pmin(x,y) #compare to min(x,y)
pmax(x,y)
```

### Logical (x and y are vectors)

```
x = c(1,2,8,7)
y = c(3,2,1,4)
x > 5
any(x>5)
all(x>5)
sum(x>5)
mean(x>5)
x[x>5]
y[y>5]
x > y
x == y
x != y
x^(x>y)
x < y | x > y
x[1] < x[2] & x[2] < x[3]
(Note: x[1] < x[2] < x[3] is not a valid logical
statement; you must break it up into pairwise
comparisons)
```

### Loops:

```
y = NA
for(i in 1:4){
  y[i] = i^2
}
y
```

A more efficient alternative to the above is:

```
y = (1:4)^2
```

### If statements:

```
x = c(1,2,8,7)
count = 0
for(i in 1:3){
  if(x[i]<x[i+1]) count = count+1
}
count
```

More efficient than the above:

```
sum(diff(x)>0)
```