Parentheses are for functions, brackets are for indicating the position of items in a vector or matrix. (Here, items with numbers like x1 are user-supplied variables.)

**Miscellaneous**

- q(): quit
- <-: assign
- INSTALL package1: install package1
- m1[,2]: column 2 of matrix m1
- m1[,2:5] or m1[,c(2,3,4,5)]: columns 2–5
- m1$a1: variable a1 in data frame m1
- NA: missing data
- is.na: true if data missing

**Help**

- help(command1): get help with command1 (NOTE: USE THIS FOR MORE DETAIL THAN THIS CARD CAN PROVIDE.)
- help.start(): start browser help
- help(package=mva): help with (e.g.) package mva
- apropos("topic1"): commands relevant to topic1
- example(command1): examples of command1

**Input and output**

- source("file1"): run the commands in file1.
- read.table("file1"): read in data from file1
- data.entry(): spreadsheet
- scan(x1): read a vector x1
- download.file(url1): from internet
- url.show(url1), read.table.url(url1): remote input
- sink("file1"): output to file1, until sink()
- write(object, "file1"): writes an object to file1
- write.table(dataframe1,"file1"): writes a table

**Managing variables and objects**

- attach(x1): put variables in x1 in search path
- detach(x1): remove from search path
- ls(): lists all the active objects.
- rm(object1): removes object1
- dim(matrix1): dimensions of matrix1
- dimnames(x1): names of dimensions of x1
- length(vector1): length of vector1
- 1:3: the vector 1,2,3
- c(1,2,3): creates the same vector
- rep(x1,n1): repeats the vector x1 n1 times
- cbind(a1,b1,c1), rbind(a1,b1,c1): binds columns or rows into a matrix
- merge(df1,df2): merge data frames
- matrix(vector1,x1,c1): make vector1 into a matrix with r1 rows and c1 columns
- data.frame(v1,v2): make a data frame from vectors v1 and v2

**Control flow**

- for (i1 in vector1): repeat what follows
- if (condition1) ... else ...: conditional

**Arithmetic**

- %*%: matrix multiplication
- %/%, ^, %%, sqrt(): integer division, power, modulus, square root

**Statistics**

- max(), min(), mean(), median(), sum(), var(): as named
- summary(data.frame): prints statistics
- rank(), sort() rank and sort
- ave(x1,y1): averages of x1 grouped by factor y1
- by(): apply function to data frame by factor
- apply(x1,n1,function1): apply function1 (e.g. mean) to x by rows (n1=1) or columns (n2=2)
- tapply(x1,list1,function1): apply function to x1 by list1
- table(): make a table
- tabulate(): tabulate a vector

**basic statistical analysis**

- aov(), anova(), lm(), glm(): linear and nonlinear models, anova
- t.test(): t test
- prop.test(), binom.test(): sign test
- chisq.test(x1): chi-square test on matrix x1
- fisher.test(): Fisher exact test
- cor(a): show correlations
- cor.test(a,b): test correlation
- friedman.test(): Friedman test

**some statistics in mva package**

- prcomp(): principal components
- kmeans(): kmeans cluster analysis
- factanal(): factor analysis
- cancor(): canonical correlation

**Graphics**

- plot(), barplot(), boxplot(), stem(), hist(): basic plots
- matplot(): matrix plot
- pairs(matrix): scatterplots
- coplot(): conditional plot
- stripplot(): strip plot
- qqplot(): quantile-quantile plot
- qqnorm(), qqline(): fit normal distribution

**as.factor()**, **as.matrix()**, **as.vector()**: conversion

- is.factor(), is.matrix(), is.vector(): what it is
- t(): switch rows and columns
- which(x1==a1): returns indices of x1 where x1==a1