

**R Quick Reference**, by E. Slate and E. Hill, adapted from the “R Reference Card” by Jonathan Baron. Parentheses are for functions, brackets are for indicating the position of items in a vector or matrix.

### Miscellaneous

q()	quit
options()	view/set global options, e.g. number of digits
history()	view past commands you've issued
<-	assignment
INSTALL packagel	install packagel
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 or list m1
NA	missing data
is.na()	true if data missing
library(mva)	load the package (e.g.) mva
require(mva)	load the package (e.g.) mva, if not already loaded
NaN	not a number
Inf	infinity
data()	available data sets
demo()	run demos

### Help

help(command1)	get help with command1 ( <i>use this command for more detail than is provided here</i> )
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
args(fn1)	show arguments for function fn1

### Input and output

source("file1")	run the commands in file1
read.table("file1"), read.csv("file1"), read.delim("file1")	read in data from file1
data.entry()	spreadsheet
scan("file1")	read from file1 (primitive)
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 to file1

### Arithmetic

%*%	matrix multiplication
/%, ^, %%, sqrt()	integer division, power, modulus, square root
outer	outer “product” function

### Managing variables and objects

attach(x1)	put variables in x1 in search path
detach(x1)	remove from search path
search()	view the search path
ls()	lists all the active objects
rm(object1)	removes object1
save(obj), save.image(fname)	save the workspace
load(fname)	load the workspace in fname
dim(matrix1)	dimensions of matrix1
dimnames(x1)	names of dimensions of x1
names(df1)	variable names in data frame df1
length(vector1)	length of vector1
1:3	the vector 1, 2, 3
c(1,2,3)	creates the same vector
seq(from,to,by), seq(from,to,length)	create a sequence
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,r1,c1)	make vector1 into a matrix with r1 rows and c1 columns
data.frame(var1=v1,var2=v2)	make a data frame from vectors v1 and v2
as.factor(), as.matrix(), as.vector()	conversion
is.factor(), is.matrix(), is.vector()	what it is—returns TRUE/FALSE
t()	transpose
which(x1==a1)	returns indices of x1 where x1==a1
unique(x1)	returns the unique elements in x1
is.element(e, x1), union(x1,x2), setdiff(x1,x2), intersect(x1,x2)	set operations

### Control flow

for (il in vector1){...}	repeat length(vector1) times
if (condition1){...} else {...}	conditional
while (condition) {...}	do while condition is TRUE

### Logic

! x	NOT x, elementwise
x & y	elementwise AND, all elements evaluated
x && y	sequential AND, only first elements of x, y used
x   y, x    y	elementwise and sequential OR
xor(x, y)	elementwise exclusive OR

### Numerical summaries

max(), min(), mean(), quantile(), median(), sum(), var(), cor()	as named
summary(data.frame)	prints statistics
rank(), sort(), order()	ranking and sorting
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
lapply(list1, function1) sapply(list1, function1)	apply function1 to the elements of list1; sapply <i>simplifies</i>
table()	make a table
tabulate()	tabulate a vector

### Basic statistical analysis

aov(), anova(), lm(), glm(), nls(), nlm()	linear and nonlinear models, anova
more for regression: confint(), deviance(), df.residual(), rstandard(), rstudent(), dffits(), dfbetas(), cooks.distance(), hatvalues(), vcov(), predict()	
t.test()	t test
prop.test(), binom.test()	proportions tests
chisq.test(matrix1)	chi-square test on matrix1 columns
fisher.test()	Fisher exact test
cor(a)	show correlations
cor.test(a,b)	test correlation
friedman.test()	Friedman test
runif(), rnorm(), rgamma(), rbeta(), rchisq(), rbinom(), rt(), rpois(), etc.	probability distributions; prefix is r = random, p = prob, d = density, q = quantile
optim	general purpose optimization
contrasts()	set dummy coding for factor variables
library(help="stats")	additional standard stat methods

### Some statistics in mva package

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

### Graphics

windows(), postscript(), pdf()	new graphics device
plot(x,y), barplot(), boxplot(), stem(), hist()	basic plots
matplot(xmat, ymat)	matrix plot ymat[,i] on xmat[,i]
pairs(matrix)	scatterplots of all pairs of columns
scatter.smooth()	scatterplot with smooth trend

coplot()	conditional plot
stripplot()	strip plot (lattice)
qqplot()	quantile-quantile plot
qqnorm(), qqline()	fit normal distribution
contour(), persp()	plots for 3D data
heatmap()	
points(), lines(), segments(), arrows(), text(), polygon(), symbols(), abline()	add to current plot
mfrow(), layout()	multiple plotting regions per page
par()	View/set graphics parameters
lattice package: xyplot(), bwplot(), densityplot(), cloud(), wireframe(), splom(), parallel()	trellis graphics

### Programming

print(), cat(), traceback(), options(error = dump.frames), debugger()	debugging
substitute()	read the help carefully!
missing()	check for missing function arguments
...	additional name = value type arguments
match.call()	expand function arguments
do.call()	evaluate a constructed function call
R CMD	DOS/unix command line interface

### Useful packages

lattice	trellis graphics
survival	survival analyses
mvtnorm	multivariate normal and t distributions
maps	displaying geographical data
boot	bootstrapping
nnet	neural nets
nlme, lme4	linear and nonlinear mixed models
hmisc, xtable	exporting tables to LaTeX, HTML, plus others
coda	handling output from BUGS (see also the BOA code)
ellipse	for elliptical confidence regions in plots
rggobi	graphical data exploration
gvlma	a new diagnostic for linear models
cluster	various clustering methods
mclust	model-based (i.e. Gaussian) clustering
gam	generalized additive models
BRugs, rbugs, R2WinBUGS	linking R and Win/OpenBUGS

See also [www.r-project.org](http://www.r-project.org), <http://cran.us.r-project.org/>, <http://www.bioconductor.org/>