Base R
Cheat Sheet

Getting Help

Accessing the help files

?mean
Get help of a particular function.

help.search('weighted mean')
Search the help files for a word or phrase.

help(package = 'dplyr')
Find help for a package.

More about an object

str(iris)
Get a summary of an object's structure.

class(iris)
Find the class an object belongs to.

Using Libraries

install.packages('dplyr')
Download and install a package from CRAN.

library(dplyr)
Load the package into the session, making all its functions available to use.

dplyr::select
Use a particular function from a package.

data(iris)
Load a build-in dataset into the environment.

Working Directory

getwd()
Find the current working directory (where inputs are found and outputs are sent).

setwd('C://file/path')
Change the current working directory.

Use projects in RStudio to set the working directory to the folder you are working in.

Vectors

Creating Vectors

c(2, 4, 6)	2 4 6	Join elements into a vector
2:6	2 3 4 5 6	An integer sequence
seq(2, 3, by=0.5)	2.0 2.5 3.0	A complex sequence
rep(1:2, times=3)	1 2 1 2 1 2	Repeat a vector
rep(1:2, each=3)	1 1 1 2 2 2	Repeat elements of a vector

Vector Functions

sort(x)
Return x sorted.

rev(x)
Return x reversed.

table(x)
See counts of values.

unique(x)
See unique values.

Selecting Vector Elements

By Position

x[4]
The fourth element.

x[-4]
All but the fourth.

x[2:4]
Elements two to four.

x[-(2:4)]
All elements except two to four.

x[c(1, 5)]
Elements one and five.

By Value

x[x == 10]
Elements which are equal to 10.

x[x < 0]
All elements less than zero.

x[x %in% c(1, 2, 5)]
Elements in the set 1, 2, 5.

Named Vectors

x['apple']
Element with name 'apple'.

Programming

For Loop

```
for (variable in sequence){
    Do something
}
```

Example

```
for (i in 1:4){
    j <- i + 10
    print(j)
}
```

While Loop

```
while (condition){
    Do something
}
```

Example

```
while (i < 5){
    print(i)
    i <- i + 1
}
```

If Statements

```
if (condition){
    Do something
} else {
    Do something different
}
```

Example

```
if (i > 3){
    print('Yes')
} else {
    print('No')
}
```

Functions

```
function_name <- function(var){
    Do something
    return(new_variable)
}
```

Example

```
square <- function(x){
    squared <- x*x
    return(squared)
}
```

Reading and Writing Data

Input

df <- read.table('file.txt')

Ouput

write.table(df, 'file.txt')

Description

Read and write a delimited text file.

---

df <- read.csv('file.csv')

write.csv(df, 'file.csv')

Read and write a comma separated value file. This is a special case of read.table/ write.table.

---

load('file.RData')

save(df, file = 'file.Rdata')

Read and write an R data file, a file type special for R.

Conditions

a == b	Are equal	a > b	Greater than	a >= b	Greater than or equal to	is.na(a)	Is missing
a != b	Not equal	a < b	Less than	a <= b	Less than or equal to	is.null(a)	Is null

Types

Converting between common data types in R. Can always go from a higher value in the table to a lower value.

as.logical	TRUE, FALSE, TRUE	Boolean values (TRUE or FALSE).
as.numeric	1, 0, 1	Integers or floating point numbers.
as.character	'1', '0', '1'	Character strings. Generally preferred to factors.
as.factor	'1', '0', '1', levels: '1', '0'	Character strings with preset levels. Needed for some statistical models.

Maths Functions

log(x)	Natural log.	**sum(x)**	Sum.
exp(x)	Exponential.	**mean(x)**	Mean.
max(x)	Largest element.	**median(x)**	Median.
min(x)	Smallest element.	**quantile(x)**	Percentage quantiles.
round(x, n)	Round to n decimal places.	**rank(x)**	Rank of elements.
signif(x, n)	Round to n significant figures.	**var(x)**	The variance.
cor(x, y)	Correlation.	**sd(x)**	The standard deviation.

Variable Assignment

```
> a <- 'apple'
> a
[1] 'apple'
```

The Environment

ls()	List all variables in the environment.
rm(x)	Remove x from the environment.
rm(list = ls())	Remove all variables from the environment.

You can use the environment panel in Studio to browse variables in your environment.

Matrixes

```
m <- matrix(x, nrow = 3, ncol = 3)
```
Create a matrix from x.

m[2,] - Select a row
m[, 1] - Select a column
m[2, 3] - Select an element

t(m) Transpose
m %*% n Matrix Multiplication
solve(m, n) Find x in: m * x = n

Lists

```
l <- list(x = 1:5, y = c('a', 'b'))
```
A list is collection of elements which can be of different types.

l[[2]] Second element of l.
l[1] New list with only the first element.
l$x Element named x.
l['y'] New list with only element named y.

Also see the **dplyr** library.

Data Frames

```
df <- data.frame(x = 1:3, y = c('a', 'b', 'c'))
```
A special case of a list where all elements are the same length.

	x	y
1	a	
2	b	
3	c	

df$x

df[[2]]

List subsetting

Matrix subsetting

df[, 2]

df[2,]

df[2, 2]

Understanding a data frame

View(df)	See the full data frame.
head(df)	See the first 6 rows.

nrow(df)	Number of rows.
ncol(df)	Number of columns.
dim(df)	Number of columns and rows.

cbind - Bind columns.

rbind - Bind rows.

Strings

Also see the **stringr** library.

paste(x, y, sep = ' ')	Join multiple vectors together.
paste(x, collapse = ' ')	Join elements of a vector together.
grep(pattern, x)	Find regular expression matches in x.
gsub(pattern, replace, x)	Replace matches in x with a string.
toupper(x)	Convert to uppercase.
tolower(x)	Convert to lowercase.
nchar(x)	Number of characters in a string.

Factors

factor(x)	Turn a vector into a factor. Can set the levels of the factor and the order.
cut(x, breaks = 4)	Turn a numeric vector into a factor but 'cutting' into sections.

Statistics

lm(x ~ y, data=df)	Linear model.
glm(x ~ y, data=df)	Generalised linear model.
summary	Get more detailed information out a model.

t.test(x, y)	Preform a t-test for difference between means.
pairwise.t.test	Preform a t-test for paired data.
prop.test	Test for a difference between proportions.
aov	Analysis of variance.

Distributions

	Random Variates	Density Function	Cumulative Distribution	Quantile
Normal	rnorm	dnorm	pnorm	qnorm
Poison	rpois	dpois	ppois	qpois
Binomial	rbinom	dbinom	pbinom	qbinom
Uniform	runif	dunif	punif	qunif

Plotting

Also see the **ggplot2** library.

plot(x)	Values of x in order.
plot(x, y)	Values of x against y.
hist(x)	Histogram of x.

Dates

See the **lubridate** library.