

Basic Math

<code>exp(x)</code>	Exponential	<code>sum(x)</code>	Sum
<code>log(x)</code>	Natural log	<code>cumsum(x)</code>	Cumulative Sum
<code>max(x)</code>	Largest element	<code>ceil(x)</code>	Round up
<code>min(x)</code>	Smallest element	<code>floor(x)</code>	Round down
<code>x %% y</code>	Modulo		

I/O

<code>write(data, "mydata.dat")</code>	Write data as binary.
<code>scan("mydata.dat")</code>	Read binary data.
<code>getcwd()</code>	Current working directory

Plotting

<code>plot(data)</code>	Plot quick overview.
<code>barplot(x, main="Title", xlab="x label")</code>	Annotated barplot of absolute frequencies
<code>plot.ecdf(data)</code>	Plot ECDF.
<code>hist(data, prob=TRUE, breaks=30)</code>	Histogram of relative frequencies (30 bins).
<code>rug(data)</code>	1D-plot
<code>abline(a, b, col="red")</code>	Add a red line with intercept <i>a</i> and slope <i>b</i> to the plot.
<code>boxplot(data1, data2, ..., range=1.5)</code>	Plot boxplots of one or more data sequences in one window. <i>range</i> determines the extend of the whiskers. Default <i>range</i> =1.5, i.e. 1.5 x IQR
<code>qqnorm(x)</code>	QQ-Plot against standard normal distribution
<code>qqplot(x, dist="unif")</code>	QQ-Plot against any R-standard distribution

Vectors

Creating Vectors

<code>c(2, 4, 6)</code>	Join elements into a vector
<code>2:6</code>	An integer sequence (end inclusive!)
<code>seq(2, 3, by=0.5)</code>	Complex sequence (s. <code>np.linspace</code>)
<code>rep(1:2, 3)</code>	Repeat vector
<code>rep(1:2, 3:4)</code>	Repeat each element

Functions

<code>sort(x)</code>	Return <i>x</i> sorted.
<code>rev(x)</code>	Return <i>x</i> reversed.
<code>unique(x)</code>	See unique values.
<code>length(x)</code>	Length of <i>x</i> .

Selecting Vector Elements



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Vectors (cont)

By Position

<code>x[4]</code>	The fourth element
<code>x[-4]</code>	All but the fourth.
<code>x[2:4]</code>	Elements two to four
<code>x[-(2:4)]</code>	All elements except 2 to four
<code>x[c(1, 5)]</code>	Elements one and five.

By Value

<code>x[x == 10]</code>	All elements equal to 10
<code>x[x < 10]</code>	All elements less than 10.
<code>x[x %in% c(1, 2, 5)]</code>	Elements in the given set.

Named Vectors

<code>x['apple']</code>	Element with name 'apple'.
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Control Flow

<code>for (variable in sequence) {...}</code>	for-loop. If the loop body contains only a single line, the curly brackets can be omitted.
<code>while (condition) {...}</code>	while-loop
<code>if (i > 5) { ... else { ... }</code>	if-else-block
<code>foo = function(arg1, arg2, ...) { ... return (var) }</code>	function

Runs Test of Randomness

<code>rle(x)</code>	Compute the lengths and values of runs of equal values in a vector .
<code>rle(x)\$lengths</code>	Vector containing the length of each run.
<code>rle(x)\$values</code>	Vector of the same length as lengths with the corresponding values.

Help

<code>?sqrt</code>	Display documentation of the command <code>sqrt</code>
<code>?'%%'</code>	use quotation marks for special characters



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Miscellaneous

Printing

<code>print("Text")</code>	Default print
<code>sprintf("Formatted %s: %.3f", object, mean)</code>	Formatted print
<code>(x=3)</code>	enclose an R command with brackets to directly print the result
<code>edit(x)</code>	Invoke text editor on R object
<code>library(MASS)</code>	Load package MASS

Random Numbers

<code>sample(1:3, prob=c(1/6, 1/3, 1/2), replace=TRUE, 20)</code>	Draw 20 balls, labeled from 1 to 3, from box with replacement.
<code>r<distr.ID>(n, params)</code>	Draw n numbers from distribution <distr.ID> with parameters params
<i>(see Distributions in R for more details)</i>	

Tables

<code>table(data)</code>	get absolute frequencies of values
<code>as.numeric(table); as.vector(table)</code>	Extract values and their absolute frequencies from table
<code>table/length(data)</code>	Compute relative frequencies

Characteristics of data sequences

<code>mean(x)</code>	Arithmetic mean of the data sequence
<code>var(x)</code>	Variance
<code>median(x)</code>	Median
<code>quantile(x, type=7)</code>	Quantile. <code>type=7</code> is the default computation algorithm, i.e. the function returns the value at position $k=1+p(n-1)$, if this is an integer. Otherwise, R computes a weighted mean of the two neighboring integers
<code>quantile(x, type=1)</code>	General inverse function of the ECDF (smallest p-quantile). Largest p-quantile can be obtained indirectly by slightly increasing p
<code>summary(x)</code>	Overview of important measures



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Data sets

Interacting with data sets

```
col_1 = data$col_1_name
```

Access column data

I/O

```
data = read.csv("file.csv", header = FALSE, sep="")
```

Read csv (function arguments similar to that used in pandas)

```
write.csv(data, "data.csv", row.names = FALSE, sep="")
```

Write data set as csv

Distributions in R

```
d<d>
```



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