# R Cheatsheet for SSR

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R can be used to do all kind of calculations and store the results in so called variables. Below you will find a list of most used statistical functions that will be used in this course. For every function an example will be given. The variables "a" and "x" are created in the first two examples and will be used in the following examples.

## Functions

| Symbol | R | Example | Result | Explanation |
|---|---|---|---|---|
| . | = | a=9 | 9 | Assign a number to a variable |
| . | c() | x=c(1,2,3) | 1, 2, 3 | Assign multiple numbers to a variable |
| = | == | a==7 | FALSE | Logical statement "a is equal to 7" |
| - | - | x-1 | 0, 1, 2 | subtraction |
| + | + | x+1 | 2, 3, 4 | addition |
| x | * | x*2 | 2, 4, 6 | multiplication |
| : | / | x/2 | 0.5, 1, 1.5 | division |
| $\sqrt{}$ | sqrt() | sqrt(a) | 3 | square root |
| $x^2$ | ^ | x^2 | 1, 4, 9 | square |
| $\bar{x}$ | mean() | mean(x) | 2 | mean |
| N | length() | length(x) | 3 | returns the length of a vector |
| $\sum$ | sum() | sum(x) | 6 | adds all numbers in a vector |
| $s^2$ | var() | var(x) | 1 | returns the variance of a vector |
| $s$ | sd() | sd(x) | 1 | returns the standard deviation of a vector |
| . | cbind() | cbind(x,a,b=x-a) | see below | combines multiple vectors |

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| Symbol | R | Example | Result | Explanation |
| --- | --- | --- | --- | --- |
| . | visualize.t() | visualize.t(2,16,"upper") | see below | visualizes the right sided $p$-value for t>2 with 16 degrees of freedom |
| . | | visualize.t(2,16,"lower") | . | and the left sided $p$-value |
| . | | visualize.t(c-2,2),16,"tails") | . | and two sided $p$-value |
| . | visualize.chisq() | visualize.chisq(4,1,"upper") | . | visualizes the right sided $p$-value for $\chi^2$>4 with 1 degree of freedom |
| . | visualize.f() | visualize.f(3,2,10,"upper") | . | visualizes the right sided $p$-value for F>3 with df(2,10) |
| . | subset() | subset(p,group==1)$y | . | returns the scores on y for group one from data frame p |
| . | ls() | ls() | "a" "x" | shows all variables stored in memory |

## cbind

Result of cbind(x,a,b=x-a)

```
##      x a  b
## [1,] 1 9 -8
## [2,] 2 9 -7
## [3,] 3 9 -6
```
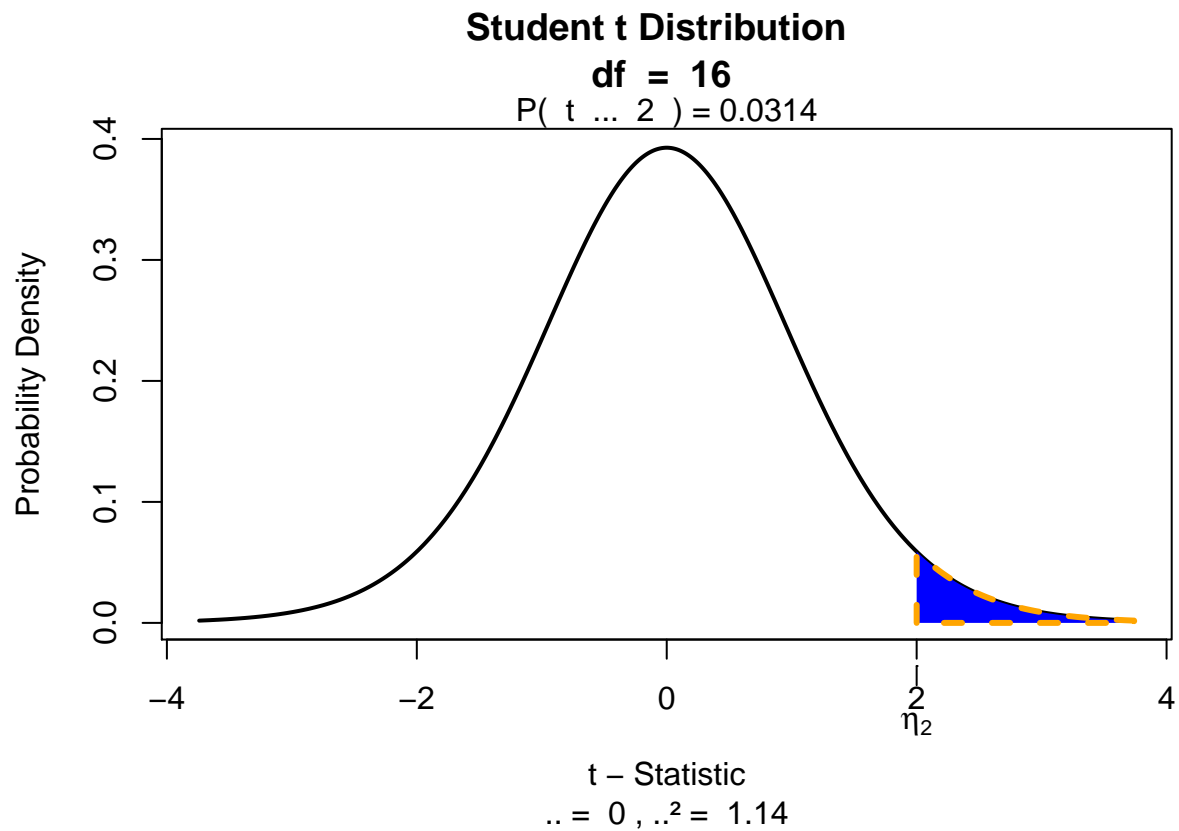
## Visualize

To use visualize you need to run the following two lines of code in R.

```
if(!"visualize" %in% installed.packages()) { install.packages("visualize") };
library("visualize");
```

**Application**

```
library(visualize);
visualize.t(2,16,"upper");
```

### Student t Distribution
#### df = 16
P( t ... 2 ) = 0.0314



t − Statistic
.. = 0 , ..² = 1.14

## Examples

**Assign numbers to variables**

```
x1=c(5,3,7,4);
x2=c(7,6,6,4);
a=2;
b=c(1,2);
```

**Calculating with variables**

Variables with the same length can be be subtracted, added, multiplied e.g. Below the number assigned tho variable `x2` is subtracted from the number assigned to `x1`.

```
x1-x2
```

```
## [1] -2 -3  1  0
```

When variable of different length are used for multiplications, the shortest variable will be repeated.

```
x1-a;
```

```
## [1] 3 1 5 2
```

```
cbind(x1,a)
```

```
##      x1 a
## [1,]  5 2
## [2,]  3 2
## [3,]  7 2
## [4,]  4 2
```

```
x1-b;
```

```
## [1] 4 1 6 2
```

```
cbind(x1,b);
```

```
##      x1 b
## [1,]  5 1
## [2,]  3 2
## [3,]  7 1
## [4,]  4 2
```