Introduction to R Software

Basics of Calculations

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R as Calculator, Built in Functions and Assignments

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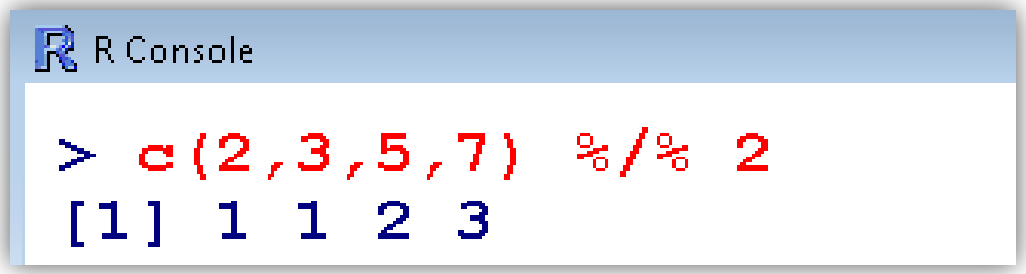
Integer Division %/%

Integer Division: **Division in which the fractional part (remainder) is discarded**

```
> c(2,3,5,7) %/% 2
[1] 1 1 2 3
```

$2\%/\%2, \quad 3\%/\%2, \quad 5\%/\%2, \quad 7\%/\%2$

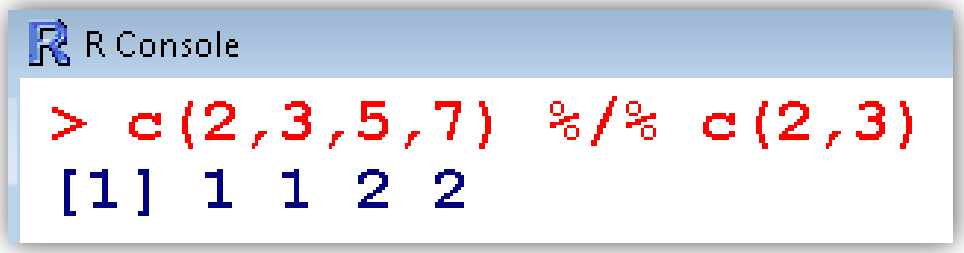


Integer Division %/%

Integer Division: **Division in which the fractional part (remainder) is discarded**

```
> c(2,3,5,7) %/% c(2,3)
[1] 1 1 2 2
```

2%/%2, 3%/%3, 5%/%2, 7%/%3

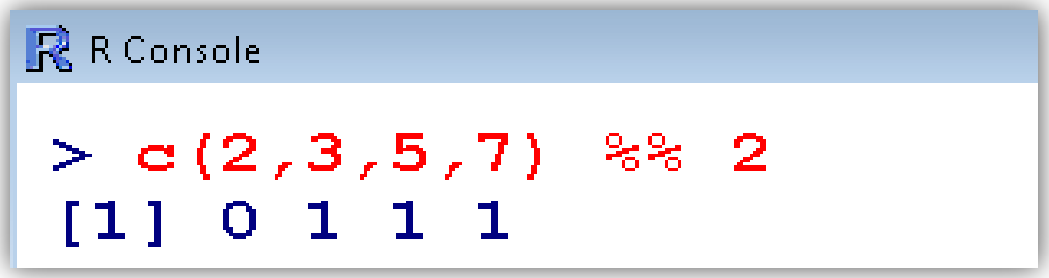


Modulo Division (x mod y) %%:

x mod y : modulo operation finds the remainder after division of one number by another

```
> c(2,3,5,7) %% 2
[1] 0 1 1 1
```

2%%2, 3%%2, 5%%2, 7%%2

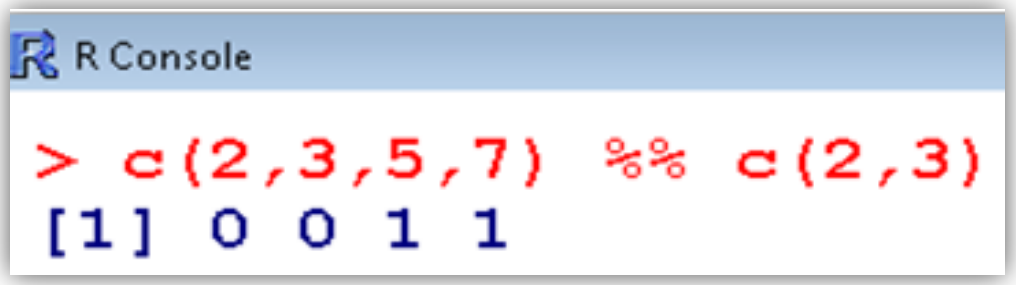


Modulo Division (x mod y) %%:

x mod y : modulo operation finds the remainder after division of one number by another

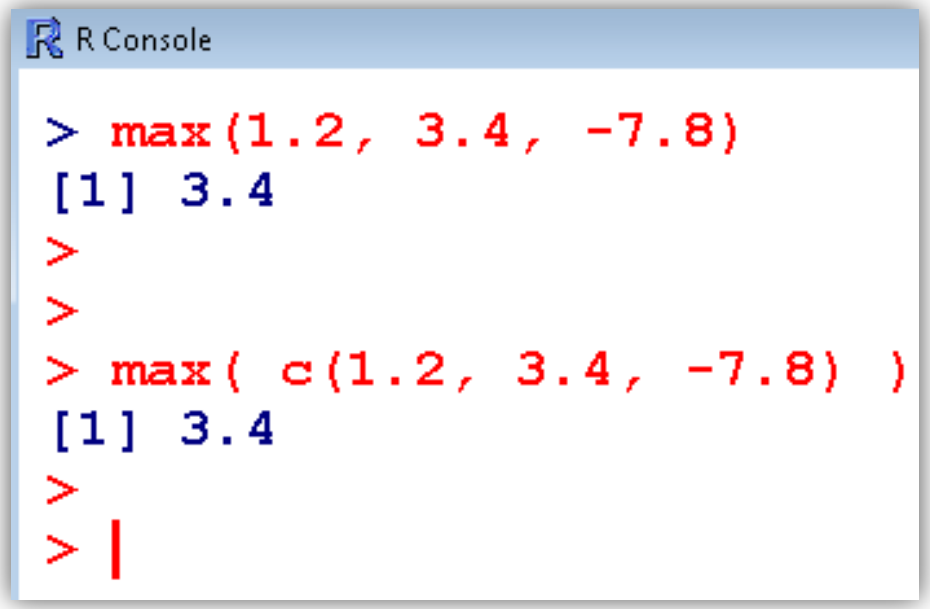
```
> c(2,3,5,7) %% c(2,3)
  [1] 0 0 1 1
```

2%%2, 3%%3, 5%%2, 7%%3



Maximum: max

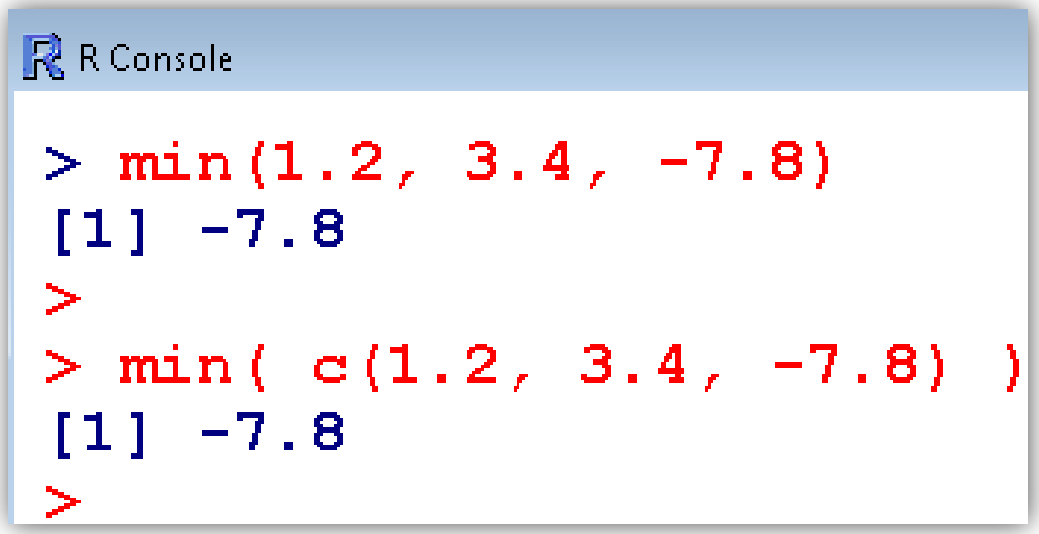
```
> max(1.2, 3.4, -7.8)
[1] 3.4
```




```
> max( c(1.2, 3.4, -7.8) )
[1] 3.4
```

Minimum : min

```
> min(1.2, 3.4, -7.8)
[1] -7.8
```



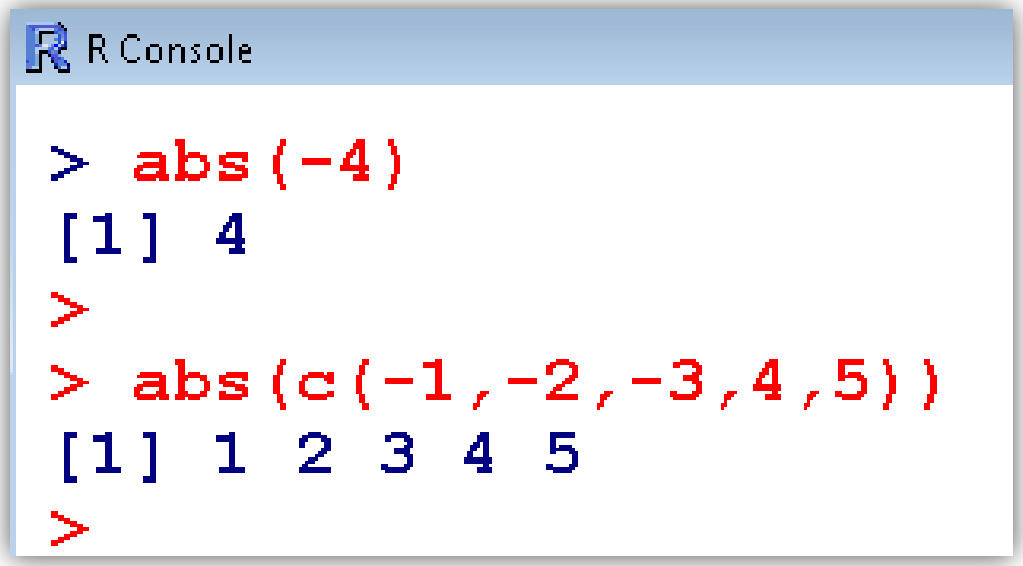

```
> min( c(1.2, 3.4, -7.8) )
[1] -7.8
```

Overview Over Further Functions

`abs()`	Absolute value
`sqrt()`	Square root
`round(), floor(), ceiling()`	Rounding, up and down
`sum(), prod()`	Sum and product
`log(), log10(), log2()`	Logarithms
`exp()`	Exponential function
`sin(), cos(), tan(),` `asin(), acos(), atan()`	Trigonometric functions
`sinh(), cosh(), tanh(),` `asinh(), acosh(), atanh()`	Hyperbolic functions

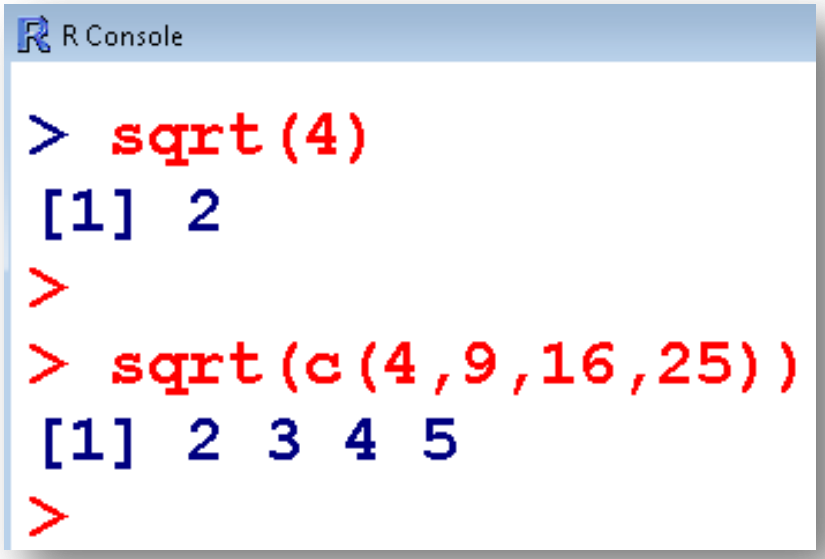
Examples

```
> abs(-4)
[1] 4

> abs(c(-1,-2,-3,4,5))
[1] 1 2 3 4 5
```



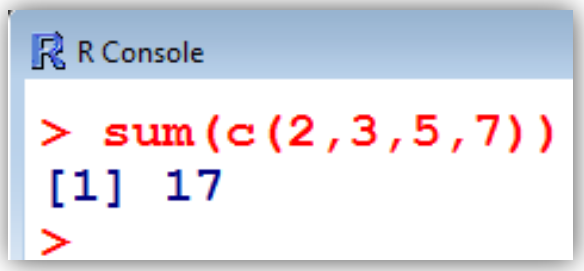
Examples

```
> sqrt(4)
[1] 2

> sqrt(c(4,9,16,25))
[1] 2 3 4 5
```

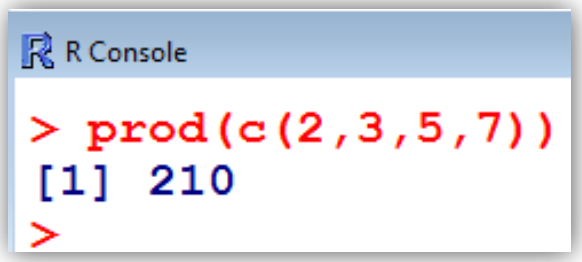


Examples

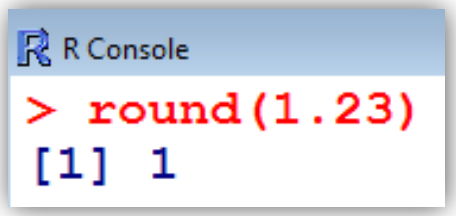
```
> sum(c(2,3,5,7))
[1] 17
```



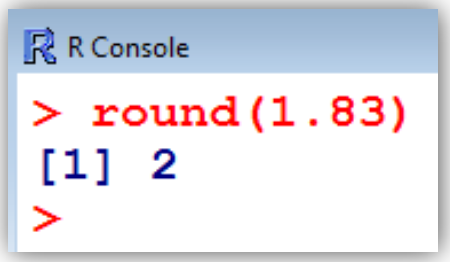

```
> prod(c(2,3,5,7))
[1] 210
```




```
> round(1.23)
[1] 1
```



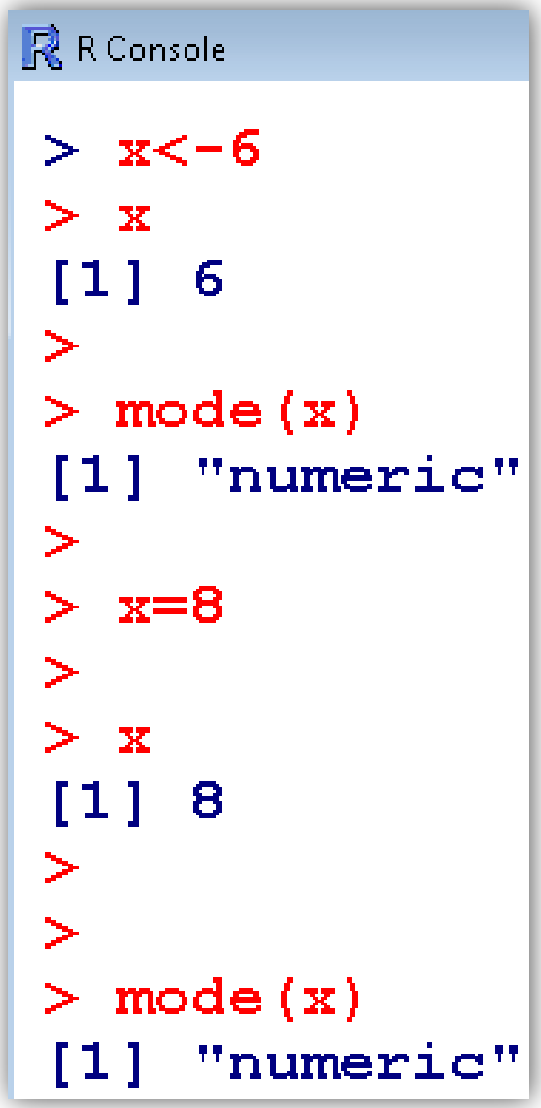

```
> round(1.83)
[1] 2
```



Assignments

Assignments can be made in two ways:

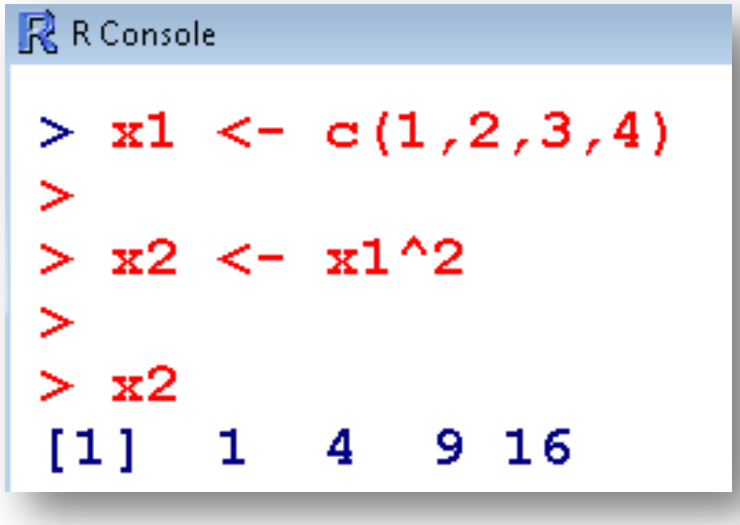
```
> x<-6
> x
   [1] 6

> mode(x)
   [1] "numeric"

> x=8
> x
   [1] 8

> mode(x)
   [1] "numeric"
```



Assignments

An assignment can also be used to save values in variables:

```
> x1 <- c(1,2,3,4)

> x2 <- x1^2

> x2
[1]  1  4  9 16
```



ATTENTION: R is case sensitive (X is not the same as x)