week03.r

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2022-01-31

```
# Hands-on Sheet
5+3
```

```
## [1] 8
```

```
5-3
```

```
## [1] 2
```

```
5*3
```

```
## [1] 15
```

```
5/3
```

```
## [1] 1.666667
```

```
x <- 3*4
#i_use_snake_case
#other.people.use.periods
#evenOthersUseCamelCase

this_is_a_really_long_name <-  2.5

r_rocks <- 2^3

# functionName(arg1 = val1, arg2 = val2, and so on)
seq(1,10)
```

```
##  [1]  1  2  3  4  5  6  7  8  9 10
```

```
help(seq)
```

```
## starting httpd help server ... done
```

```
seq(1,10, by=2)
```

```
## [1] 1 3 5 7 9
```

```
example(seq)
```

```
##
## seq> seq(0, 1, length.out = 11)
##  [1] 0.0 0.1 0.2 0.3 0.4 0.5 0.6 0.7 0.8 0.9 1.0
##
```

```
## seq> seq(stats::rnorm(20)) # effectively 'along'
##  [1]  1  2  3  4  5  6  7  8  9 10 11 12 13 14 15 16 17 18 19 20
##
## seq> seq(1, 9, by = 2)     # matches 'end'
## [1] 1 3 5 7 9
##
## seq> seq(1, 9, by = pi)    # stays below 'end'
## [1] 1.000000 4.141593 7.283185
##
## seq> seq(1, 6, by = 3)
## [1] 1 4
##
## seq> seq(1.575, 5.125, by = 0.05)
##  [1] 1.575 1.625 1.675 1.725 1.775 1.825 1.875 1.925 1.975 2.025 2.075
2.125
## [13] 2.175 2.225 2.275 2.325 2.375 2.425 2.475 2.525 2.575 2.625 2.675
2.725
## [25] 2.775 2.825 2.875 2.925 2.975 3.025 3.075 3.125 3.175 3.225 3.275
3.325
## [37] 3.375 3.425 3.475 3.525 3.575 3.625 3.675 3.725 3.775 3.825 3.875
3.925
## [49] 3.975 4.025 4.075 4.125 4.175 4.225 4.275 4.325 4.375 4.425 4.475
4.525
## [61] 4.575 4.625 4.675 4.725 4.775 4.825 4.875 4.925 4.975 5.025 5.075
5.125
##
## seq> seq(17) # same as 1:17, or even better seq_len(17)
##  [1]  1  2  3  4  5  6  7  8  9 10 11 12 13 14 15 16 17
```

```
date()
```

```
## [1] "Mon Jan 31 02:32:31 2022"
```

```
help(log)
?log
example(log)
```

```
##
## log> log(exp(3))
## [1] 3
##
## log> log10(1e7) # = 7
## [1] 7
##
## log> x <- 10^-(1+2*1:9)
##
## log> cbind(x, log(1+x), log1p(x), exp(x)-1, expm1(x))
##           x
##  [1,] 1e-03 9.995003e-04 9.995003e-04 1.000500e-03 1.000500e-03
##  [2,] 1e-05 9.999950e-06 9.999950e-06 1.000005e-05 1.000005e-05
##  [3,] 1e-07 1.000000e-07 1.000000e-07 1.000000e-07 1.000000e-07
```

```
##  [4,] 1e-09 1.000000e-09 1.000000e-09 1.000000e-09 1.000000e-09
##  [5,] 1e-11 1.000000e-11 1.000000e-11 1.000000e-11 1.000000e-11
##  [6,] 1e-13 9.992007e-14 1.000000e-13 9.992007e-14 1.000000e-13
##  [7,] 1e-15 1.110223e-15 1.000000e-15 1.110223e-15 1.000000e-15
##  [8,] 1e-17 0.000000e+00 1.000000e-17 0.000000e+00 1.000000e-17
##  [9,] 1e-19 0.000000e+00 1.000000e-19 0.000000e+00 1.000000e-19
```

```
length(3.1)
```

```
## [1] 1
```

```
x <- c(56, 95.3, 0.4)
x
```

```
## [1] 56.0 95.3  0.4
```

```
y <- c(3.2, 1.1, 0.2)
y
```

```
## [1] 3.2 1.1 0.2
```

```
x+y
```

```
## [1] 59.2 96.4  0.6
```

```
x-y
```

```
## [1] 52.8 94.2  0.2
```

```
x/y
```

```
## [1] 17.50000 86.63636  2.00000
```

```
sqrt(x)
```

```
## [1] 7.4833148 9.7621719 0.6324555
```

```
round(sqrt(x), 3)
```

```
## [1] 7.483 9.762 0.632
```

```
log(x)/2 + 1
```

```
## [1] 3.0126758 3.2785149 0.5418546
```

```
x <- c(56, 95.3, 0.4)
x[2]
```

```
## [1] 95.3
```

```
x[1]
```

```
## [1] 56
```

```
x[4]
```

```
## [1] NA
```

```
x[3] <- 0.5
x
```

```
## [1] 56.0 95.3  0.5
```

```
sessionInfo()
```

```
## R version 4.1.2 (2021-11-01)
## Platform: x86_64-w64-mingw32/x64 (64-bit)
## Running under: Windows 10 x64 (build 19042)
##
## Matrix products: default
##
## locale:
## [1] LC_COLLATE=English_United States.1252
## [2] LC_CTYPE=English_United States.1252
## [3] LC_MONETARY=English_United States.1252
## [4] LC_NUMERIC=C
## [5] LC_TIME=English_United States.1252
##
## attached base packages:
## [1] stats     graphics  grDevices utils     datasets  methods   base
##
## loaded via a namespace (and not attached):
##  [1] compiler_4.1.2  magrittr_2.0.1  fastmap_1.1.0   tools_4.1.2
##  [5] htmltools_0.5.2 yaml_2.2.2      stringi_1.7.6   rmarkdown_2.11
##  [9] highr_0.9       knitr_1.37      stringr_1.4.0   xfun_0.29
## [13] digest_0.6.29   rlang_0.4.12    evaluate_0.14
```

```
# Lab walk-through
x <- 1:5
x
```

```
## [1] 1 2 3 4 5
```

```
x <- 1:50
x
```

```
##  [1]  1  2  3  4  5  6  7  8  9 10 11 12 13 14 15 16 17 18 19 20 21 22 23
24 25
## [26] 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48
49 50
```

```
x <- 1:5
x
```

```
## [1] 1 2 3 4 5
```

```
x+50
```

```
## [1] 51 52 53 54 55
```

```
x+100
```

```
## [1] 101 102 103 104 105
```

```
x+ c(100, 1, 1, 1, 100)
```

```
## [1] 101   3   4   5 105
```

```
x + c(100, 1)
```

```
## Warning in x + c(100, 1): longer object length is not a multiple of
shorter
## object length
```

```
## [1] 101   3 103   5 105
```

```
x + c(100, 1, 100, 1, 100)
```

```
## [1] 101   3 103   5 105
```

```
y <-  c("alice", "jim", "chandra", "elisa")
y
```

```
## [1] "alice"   "jim"     "chandra" "elisa"
```

```
paste(y, "loves R")
```

```
## [1] "alice loves R"   "jim loves R"     "chandra loves R" "elisa loves R"
```

```
z <-  c(TRUE, FALSE, TRUE, TRUE)
z
```

```
## [1]  TRUE FALSE  TRUE  TRUE
```

```
z + 5
```

```
## [1] 6 5 6 6
```

```
c(1, 0, 1, 1) + 5
```

```
## [1] 6 5 6 6
```

```
c(T, F, T, T) + 5
```

```
## [1] 6 5 6 6
```

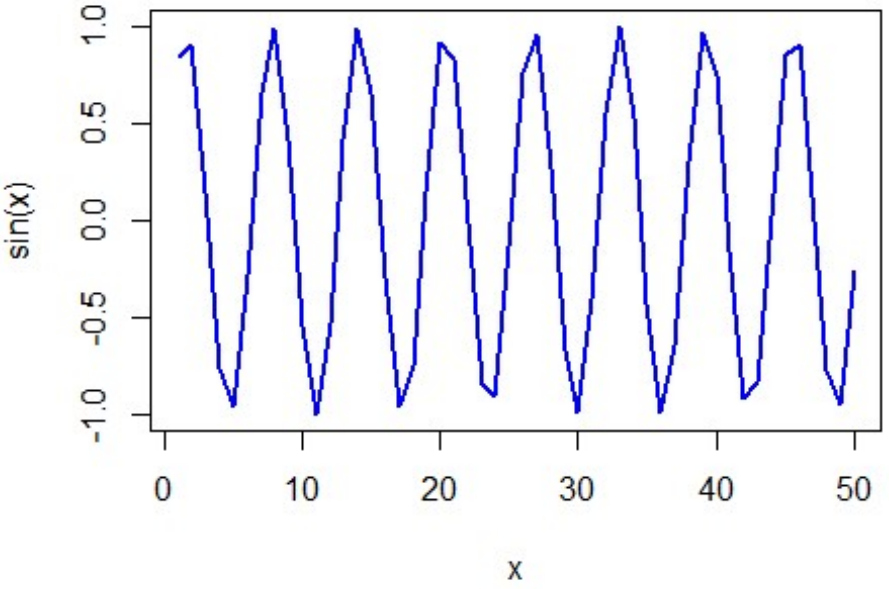
```
grades <- c(alice = 10, jim = 6, chandra = 7, elisa = 9)
grades
```

```
##   alice     jim chandra   elisa
##      10       6       7       9
```

```
mean(grades)
```

```
## [1] 8

sum(grades)

## [1] 32

sort(grades)

##     jim chandra   elisa   alice
##       6       7       9      10

sort(grades, decreasing = TRUE)

##   alice   elisa chandra     jim
##      10       9       7       6

which.min(grades)

## jim
##   2

grades

##   alice     jim chandra   elisa
##      10       6       7       9

grades < 8

##   alice     jim chandra   elisa
##   FALSE    TRUE    TRUE   FALSE

which.max(grades)

## alice
##     1

grades

##   alice     jim chandra   elisa
##      10       6       7       9

silly <-  c("jim", "alice", 4, 10)
silly

## [1] "jim"   "alice" "4"     "10"

df <-  data.frame(nums=1:5, chars = letters[1:5])
df

##   nums chars
## 1    1     a
## 2    2     b
## 3    3     c
```

```
## 4    4     d
## 5    5     e

df$nums

## [1] 1 2 3 4 5

df$chars

## [1] "a" "b" "c" "d" "e"

mean(df$nums)

## [1] 3

sum(df$nums)

## [1] 15

x

## [1] 1 2 3 4 5

x[3]

## [1] 3

df[,2]

## [1] "a" "b" "c" "d" "e"

df[3,2]

## [1] "c"

df[3,]

##   nums chars
## 3    3     c

View(df)
rm(df)

#Plot
x <- 1:50
x

##  [1]  1  2  3  4  5  6  7  8  9 10 11 12 13 14 15 16 17 18 19 20 21 22 23
24 25
## [26] 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48
49 50

plot(x, sin(x), typ="l", col="blue", lwd = 2)
```


sin(x)
1.0
0.5
0.0
-0.5
-1.0
0
10
20
30
40
50
x