Homework 1

Question 1. Answer the following questions

a) Output of pi, round(pi), round(pi, digits = 4), trunc(pi), ceiling(pi), floor(pi)

```
pi                      # Output: 3.141593
round(pi)               # Output: 3
round(pi, digits = 4)   # Output: 3.1416
trunc(pi)               # Output: 3
ceiling(pi)             # Output: 4
floor(pi)               # Output: 3
```

b) Output of sqrt(16), 16^0.5

```
sqrt(16)        # Output: 4
16^0.5          # Output: 4
```

c) Output of 4^3

```
4^3             # Output: 64
```

d) Output of log10(1000), log(1000), log2(64)

```
log10(1000)         # Output: 3
log(1000)           # Output: 6.907755
log2(64)            # Output: 6
```

e) Output of the first few lines of ? log

The text does match the results from part d) according to the first few lines from the help documentation.

Question 2. Do the following using the character vector:
queue <- c("Steve", "Russell", "Alison", "Liam")

Barry arrives and stands at the end of the line

```
queue <- c(queue, "Barry")
```

```
queue
```

Steve is served and is no longer in the line

```
queue <- queue[! queue %in% c("Steve")]
```

```
queue
```

Pam arrives and talks her way to the front of the line

```
queue <- c("Pam", queue)
```

```
queue
```

Barry is super impatient and leaves the line

```
queue <- queue[! queue %in% c("Barry")]
```

```
queue
```

Question 3. Do the following using the following objects
w <- 6

x <- 7

y <- 8

z <- 9

a) Command that lists the objects in the workspace

```
ls()
```

b) Command that removes x from the workspace

```
rm(x)
```

```
ls()
```

c) Command that removes all the objects in the workspace

```
rm(list = ls())
```

```
ls()
```

Question 4. Do the following from the given vector.

x <- c(3, 2, 0, 1, 4, 5, 9, 0, 6, 7, 2, 8)

a) Result of x == 0

   # Output: FALSE FALSE TRUE FALSE FALSE FALSE FALSE TRUE FALSE FALSE FALSE FALSE

b) Command using sum() and x == 0

   sum(x == 0)   # Output: 2

c) Command finding the proportion of elements of x that are equal to 0

   proportion <- any(x == 0) / length(x)
   proportion   # Output: 0.08333333

Question 5. Create the following data frame

numVec <- c(2, 4, 6, 5, 9, 8, 2, 4, 7, 8)

charVec <- c("a", "b", "c", "c", "b", "c", "a", "b", "b", "c")

myData <- data.frame(x1 = numVec, x2 = charVec, stringsAsFactors = FALSE)

a) What do the following commands do?
   myData$x1
   myData[["x1"]]
   myData[[1]]
   The above commands result in the following.
   # Output: 2 4 6 5 9 8 2 4 7 8

b) What kind of objects is returned by the commands in part a) using is.vector(), is.list(),
   is.data.frame()? If the output is a vector, is it a character or numeric vector?
   The object returned from the above commands is a vector. The vector is a numeric vector.

c) What does the following commands do?
   myData[2,]   # Output: x1   x2
                                    #   2   4   b
   myData[, 2]   # Output: "a" "b" "c" "c" "b" "c" "a" "b" "b" "c"

d) What is the class of the myData
   class(myData)   # Output: "data.frame"

e) What is the result of the following command?
   summary(myData)
   # Output:
   #   x1   x2
   # Min.   :2.00   Length:10
   # 1st Qu.   :4.00   Class   :character
   # Median   :5.50   Mode :character
   # Mean   :5.50
   # 3rd Qu.   :7.75
   # Max.   :9.00

Appendix B Problems.

Question B.2) Which of these kinds of names should be wrapped with quotation marks when used in R?

• function name

• file name

• the name of an argument in a named argument

• object name

The only kind of names that should be wrapped with quotation marks is the file name.

Question B.9) A user has typed the following commands into the RStudio console. Report the following commands and what class they belong to.

a <- c(10, 15)

b <- c(TRUE, FALSE)

c <- c("happy", "sad")

data.frame(a, b, c)

	a	b	c
1	10	TRUE	happy
2	15	FALSE	sad

The class of the above command is "data.frame".

cbind(a, b)

	a	b
[1,]	10	1
[2,]	15	0

The class of the above command is "matrix" "array".

rbind(a, b)

	[,1]	[,2]
a	10	15
b	1	0

The class of the above command is "matrix" "array".

cbind(a, b, c)

	a	b	c
[1,]	"10"	"TRUE"	"happy"
[2,]	"15"	"FALSE"	"sad"

The class of the above command is "matrix" "array".

list(a, b, c)[[2]]

[1] TRUE FALSE

The class of the above command is "logical".

Question B.4) Using the following commands tell what the results return.

mylist <- list(x1 = "sally", x2 = 42, x3 = FALSE, x4 = 1:5)

```r
is.list(mylist)              # Output: TRUE
names(mylist)                # Output: "x1" "x2" "x3" "x4"
length(mylist)               # Output: 4
mylist[[2]]                  # Output: 42
mylist[["x1"]]               # Output: "sally"
mylist$x2                    # Output: 42
length(mylist[["x4"]])       # Output: 5
class(mylist)                # Output: "list"
typeof(mylist)               # Output: "list"
class(mylist[[4]])           # Output: "integer"
typeof(mylist[[3]])          # Output: "logical"
```