Section 9

Exercises for section 9.1,9.2,9.3, and 9.6

9.1

9.1.0.0.1

a%%b = divide a by b and give the remainder
a%/%b= give the number of times b can be multiplied into a (division without taking into account remainder)

9.1.1.0.1

If the length of the longer is not a multiple of the shorter, R will give an error message and not complete the calculation

9.1.2.0.1

```
v<-seq(1,13,4) ; v
```

```
## [1]  1  5  9 13
```

```
v<-seq(1,5,0.2) ; v
```

```
##  [1] 1.0 1.2 1.4 1.6 1.8 2.0 2.2 2.4 2.6 2.8 3.0 3.2 3.4 3.6 3.8 4.0 4.2
## [18] 4.4 4.6 4.8 5.0
```

9.1.2.0.2

When to is less than from, the sequence will count down at the increments specified using by.

```
v<-(3:1) ; v
```

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

9.1.3.0.1

```
z<-c(1,3,5,7,9,11) ; z
```

```
## [1]  1  3  5  7  9 11
```

```
v<-z[seq(1,5,2)] ; v
```

```
## [1] 1 5 9
```

Using seq(1,5,2) produces a vector with numbers 1,3,5.
Indexing vector z by this sequence gives the 1st (1), third (5), and fifth (9) values in the z vector

9.1.3.0.2

```
v<-z[c(2,1,3)] ; v
```

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

9.1.3.0.3

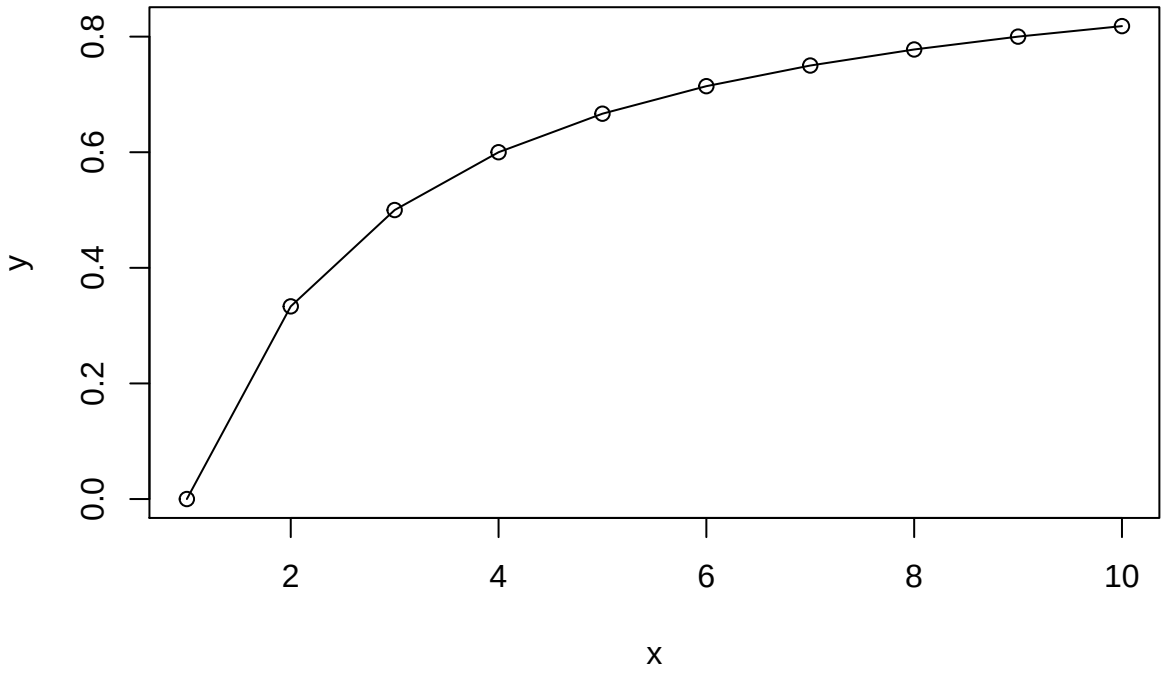
```
z[9]<-11 ; z
```

```
## [1]  1  3  5  7  9 11 NA NA 11
```

This sets the value of the undefined element as the value specified and fills in all the values between the last defined element and the new element with NA

9.1.3.0.4

```
x<-1:10
CalcY<-function(x){
  y=(x-1)/(x+1)
}
for (i in x){
  y<-c(CalcY(x))
}
plot(x,y)
lines(x,y)
```



9.1.3.0.5

In the third case, x rounded to 7 decimal places was once again 2.
When subtracting in the 3rd case, the scientific notation becomes smaller than e-15 so the value is rounded.

9.1.3.0.6

```
G<-c(0.5^seq(1,10))
SumDiffF<-sum(G)-(1/(1-0.5)) ; SumDiffF
```

```
## [1] -1.000977
```

```
H<-c(0.5^seq(1,50))
SumDiffH<-sum(H)-(1/(1-0.5)) ; SumDiffH
```

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

9.1.5.0.1

```
Light <- c(20,20,20,20,21,24,44,60,90,94,101)
rmax <- c(1.73,1.65,2.02,1.89,2.61,1.36,2.37,2.08,2.69,2.32,3.67)
lowLight <- Light[Light<50]
lowLightrmax <- rmax[Light<50]
```

Replacing the name lowLight for Light would re-write the Light vector to only include values under 50. This would be the wrong thing to do because it would yield a new Light vector

9.1.5.0.2

```
w<-runif(20)
wFltrd<-w[w < mean(w)] ; wFltrd
```

```
##  [1] 0.40144430 0.09437497 0.10294839 0.04847509 0.00901619 0.31882113
##  [7] 0.29752242 0.41155083 0.27542841 0.33314919 0.30449319 0.25884688
```

9.1.5.0.3

```
Pos<-which(w < mean(w)) ; Pos
```

```
##  [1]  3  4  7  8 10 11 12 13 14 15 18 20
```

9.1.5.0.4

```
x[c(seq(1,length(x),3))]
```

```
## [1]  1  4  7 10
```

```
x[c(TRUE, FALSE)]
```

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

9.2

9.2.1.0.1

```
v<-c(1,2)
x <- matrix(v,nrow = 2, ncol = 4) ; x
```

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

9.2.1.0.1

```
x<-matrix(rnorm(35),nrow = 5, ncol = 7)
```

9.2.2.0.1

```
C <- cbind(1:3,4:6,5:7)
D <- rbind(1:3,4:6)
rbind(C,D)
```

```
##      [,1] [,2] [,3]
## [1,]    1    4    5
## [2,]    2    5    6
## [3,]    3    6    7
## [4,]    1    2    3
## [5,]    4    5    6
```

```
cbind(C,C)
```

```
##      [,1] [,2] [,3] [,4] [,5] [,6]
## [1,]    1    4    5    1    4    5
## [2,]    2    5    6    2    5    6
## [3,]    3    6    7    3    6    7
```

```
#cbind(C,D)
```

rbinding the 2 matrices works because they have the same number of columns but cbinding the 2 matrices won't work because they have a different number of rows

9.3

9.3.0.0.1

```
x <- seq(1,27)
dim(x) <- c(3,9)
is.array(x)
```

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

```
is.matrix(x)
```

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

The vector has been assigned the dimensions following c(. . . . It is now a 2D array which is a matrix

9.6

9.6.0.0.1

```
HurricaneDF<-read.csv("http://kingaa.github.io/R_Tutorial/hurricanes.csv",comment.char='#')
str(HurricaneDF)
```

```
## 'data.frame':    92 obs. of  14 variables:
##  $ Year                    : int  1950 1950 1952 1953 1953 1954 1954 1954 1955 1955 ...
##  $ Name                    : Factor w/ 83 levels "Able","Agnes",..: 38 77 1 9 47 20 40 60 27 33 ...
##  $ MasFem                  : num  6.78 1.39 3.83 9.83 8.33 ...
##  $ MinPressure_before      : int  958 955 985 987 985 960 954 938 962 987 ...
##  $ Minpressure_Updated.2014: int  960 955 985 987 985 960 954 938 962 987 ...
##  $ Gender_MF               : int  1 0 0 1 1 1 1 1 1 1 ...
##  $ Category                : int  3 3 1 1 1 3 3 4 3 1 ...
##  $ alldeaths               : int  2 4 3 1 0 60 20 20 0 200 ...
```

```
##  $ NDAM                  : int  1590 5350 150 58 15 19321 3230 24260 2030 14730 ...
##  $ Elapsed.Yrs           : int  63 63 61 60 60 59 59 59 58 58 ...
##  $ Source                : Factor w/ 3 levels "http://www.nhc.noaa.gov/pdf/NWS-TPC-5.pdf",..: 2 2 1
##  $ ZMasFem               : num  -0.00094 -1.67076 -0.91331 0.94587 0.48108 ...
##  $ ZMinPressure_A        : num  -0.356 -0.511 1.038 1.141 1.038 ...
##  $ ZNDAM                 : num  -0.439 -0.148 -0.55 -0.558 -0.561 ...
```