Midterm Level Problems With Solutions

1. Name the three main types of data (vectors) in R.
   numeric, logical, character

2. What makes a data frame different from a list?
   Data frame is a list that contains only vectors of the same length.

3. Name four ways of extracting elements (subsetting) from a vector in R.
   inclusion (or position) [1:4], exclusion [-1], name ["e"], logical[x==5], and all [] are all possibilities (each followed by what you'd put in brackets).

4. Name three optional (ie besides x and y) arguments for the plot and/or par functions and say briefly what they do.
   col specifies color, cex specifies character size, pch specifies character type
   main gives title, xlab labels x axis, ylab labels y axis, many many others...

5. Suppose I have a function, myfun(), and I want to know how long it takes to run. Write down a line of code that will return the amount of time it takes (and possibly more information as well).
   system.time(myfun())

6. Write two lines of R code to create a matrix m that looks like this: *4 pts*

```
> m
  a b c
d 1 2 3
e 4 5 6
```

   m=matrix(1:6,2,3,byrow=T)
   dimnames(m)=list(letters[4:5],letters[1:3])

7. Write down what will happen if I do each of the following, using the matrix m from the previous problem. For full credit write exactly what will appear on the next line when you hit return; for partial credit write an English explanation. *4 pts each*

```
 i) m[-1,2]
ii) sapply(m,mean)
iii) sapply(as.data.frame(m,mean))
```

   [1] 5
   [1] 1 4 2 5 3 6
   [1] 2.5 3.5 4.5

8. Write a line of R code to return a simulation of a fair six-sided die roll (in other words, returns the digits 1 through 6 each with $\frac{1}{6}$ chance):

   (a) using the sample function
   sample(1:6,1)

   (b) not using the sample function
   ceiling(runif(1)*6) #many ways to do this