

R Notebook

1. Store the values - 20, - 15, - 5, 8, 12, 9, 2, 23, 19 in the R variable x and use the R command sum to verify that the sum of the values is 33.

```
x<- c(-20,-15,-5,8,12,9,2,23,19)
sum(x)
## [1] 33
```

2. For the data in Exercise 1, verify that the average is 3.67 using the R command mean

```
round(mean(x),2)
## [1] 3.67
```

3. What R commands can be used to compute an average without using the R command mean ?

```
sum(x)/length(x)
## [1] 3.666667
```

4. In Exercise 1, use R to sum the positive values ignoring the negative values.

```
sum(x[x>0])
## [1] 73
```

5. In Exercise1, use the which command to get the average of the values ignoring the largest value.

```
mean(x[which(max(x)!= x)])
## [1] 1.25
```

6. If the data in Exercise1 are stored in the variable x , speculate about the values corresponding to $x[abs(x) \geq 8 \ \& \ x < 8]$. Verify your speculation using this R command.

```
x_abs<-abs(x)
x_abs
## [1] 20 15 5 8 12 9 2 23 19
abs(x)>=8&x<8
## [1] TRUE TRUE FALSE FALSE FALSE FALSE FALSE FALSE
```

7. You record your commute time to work for 10 days, in minutes, and get 23, 18, 29, 22, 24, 27, 28, 19, 28, 23. Use R to determine the average, the shortest time, and the longest time.

```
time <- c(23, 18, 29, 22, 24, 27, 28, 19, 28, 23)
mean(time)

## [1] 24.1

min(time)

## [1] 18

max(time)

## [1] 29
```

8. Verify that the commands `y=c(2,4,8)` `z=c(1,5,2)` `2*y` return the values 4, 8, 16. Also, verify that the R command `y+z` returns 3, 9, 10 and that the command `y-2` returns 0,2,6.

```
y=c(2,4,8)
z=c(1,5,2)
2*y

## [1] 4 8 16

y+z

## [1] 3 9 10

y-2

## [1] 0 2 6
```

9. Let `x = c(1, 8, 2, 6, 3, 8, 5, 5, 5, 5)`. Use R to compute the average using the `sum` and `length` commands. Next, use a single command to subtract the value 4 from each value stored in `x`. Finally, find the difference between the largest and smallest values stored in `x`. (This difference is called the range.) You can use the `max` and `min` functions or the `range` function.

```
x = c(1, 8, 2, 6, 3, 8, 5, 5, 5, 5)
sum(x)/length(x)

## [1] 4.8

x-4

## [1] -3 4 -2 2 -1 4 1 1 1 1

range(x)[2]-range(x)[1]

## [1] 7
```

10. For the data in Exercise 9, use R to subtract the average from each value, and then sum the results.

```
round(sum(x-mean(x)))

## [1] 0
```