

Exercise 1 Solution Key

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Question 1

1.a)

```
((3/8)*7)+12
```

```
## [1] 14.625
```

1.b)

```
log(15)
```

```
## [1] 2.70805
```

1.c)

```
sqrt(8)
```

```
## [1] 2.828427
```

Question 2

```
C<-c(37,27,14)
```

```
Fah<- ((C*9)/5)+32
```

```
Fah
```

```
## [1] 98.6 80.6 57.2
```

Question 3

3.a)

```
rep(seq(-10,10,2),3)
```

```
## [1] -10 -8 -6 -4 -2 0 2 4 6 8 10 -10 -8 -6 -4 -2 0
2 4
## [20] 6 8 10 -10 -8 -6 -4 -2 0 2 4 6 8 10
```

3.b)

```
rep(seq(-10,10,2),rep(3,11))
```

```
## [1] -10 -10 -10 -8 -8 -8 -6 -6 -6 -4 -4 -4 -2 -2 -2 0 0
0 2
## [20] 2 2 4 4 4 6 6 6 8 8 8 10 10 10
```

3.c)

```
c(seq(2,8,2),seq(8,2,-2))
```

```
## [1] 2 4 6 8 8 6 4 2
```

3.d)

```
a<-c("1","2","3","red")
```

```
rep(a,3)
```

```
## [1] "1" "2" "3" "red" "1" "2" "3" "red" "1" "2" "3"
"red"
```

3.e)

```
rep(c(2,3,5),seq(4,2,-1))
```

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

Question 4

Here, I will create my matrices by using matrix and c object.

```
A=matrix(c(1.2,2.45,1.46,1.3,0.89,4.12,0.5,1.6,8.1),ncol=3)
```

```
B=matrix(c(1.8,2,1,8.1,1.9,1.9,1.9,2.3,3.8),ncol=3)
```

4.a)

```
A*B
```

```
##      [,1] [,2] [,3]
## [1,] 2.16 10.530 0.95
## [2,] 4.90 1.691 3.68
## [3,] 1.46 7.828 30.78
```

4.b)

```
solve(A) #inverse of A
```

```
##      [,1] [,2] [,3]
## [1,] -0.03500908 0.4805946 -0.09277122
## [2,] 0.99347481 -0.5100999 0.03943486
## [3,] -0.49901271 0.1728325 0.12012029
```

```
t(A) #transpose of A
```

```
##      [,1] [,2] [,3]
## [1,] 1.2 2.45 1.46
```

```
## [2,] 1.3 0.89 4.12
## [3,] 0.5 1.60 8.10

solve(B) #inverse of B

##           [,1]      [,2]      [,3]
## [1,] -0.08335771  0.7946768 -0.439309740
## [2,]  0.15501609 -0.1444867  0.009944428
## [3,] -0.05557180 -0.1368821  0.373793507

t(B) #transpose of B

##           [,1] [,2] [,3]
## [1,] 1.8 2.0 1.0
## [2,] 8.1 1.9 1.9
## [3,] 1.9 2.3 3.8
```

4.c)

A-B

```
##           [,1] [,2] [,3]
## [1,] -0.60 -6.80 -1.4
## [2,]  0.45 -1.01 -0.7
## [3,]  0.46  2.22  4.3
```

A+B

```
##           [,1] [,2] [,3]
## [1,] 3.00 9.40 2.4
## [2,] 4.45 2.79 3.9
## [3,] 2.46 6.02 11.9
```

Question 5

As in the previous question, I will create my matrices by using `matrix` and `c` object. Then, I name columns by using `colnames()` function. Note that you can solve this question using `data.frame`.

```
m<-matrix(c(20,21,22,23,12,14,12,16,40,45,45,80),ncol=3)
print(m)

##           [,1] [,2] [,3]
## [1,] 20 12 40
## [2,] 21 14 45
## [3,] 22 12 45
## [4,] 23 16 80

colnames(m)=c("Length", "Speed", "Algae")
```

5.a)

```
m[3, "Algae"]
```

```
## Algae
##    45
```

5.b)

```
m[3,]
## Length Speed  Algae
##    22    12    45
```

5.c)

```
m[c(1,3),]
##      Length Speed  Algae
## [1,]     20    12    40
## [2,]     22    12    45
```

5.d)

```
m[, "Speed"]
## [1] 12 14 12 16
```

5.e)

```
m[, c("Length", "Speed")]
##      Length Speed
## [1,]     20    12
## [2,]     21    14
## [3,]     22    12
## [4,]     23    16
```