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
```