 # Exercise 1 Solution:

```
> func1(datatest)
          [,1]      [,2]    [,3]                         [,4]
list      "Degree" "Cost" "Cross Validated Accuracy" "Training Accuracy"
accuracy 1        100    25.9277                     27.65142
accuracy 1        10     26.43045                    26.88532
accuracy 1        1      25.1616                     26.19105
accuracy 1        0.1    24.2758                     24.63491
accuracy 2        100    26.50227                    31.79315
accuracy 2        10     26.11922                    28.82452
accuracy 2        1      26.19105                    27.43596
accuracy 2        0.1    24.15609                    24.87431
accuracy 3        100    26.55016                    33.68446
accuracy 3        10     26.11922                    29.56667
accuracy 3        1      25.01796                    26.71774
accuracy 3        0.1    23.84486                    24.61096
[1] "Combination that resulted in Highest CV is : "
$Degree
$Degree[[1]]
[1] 3


$Cost
$Cost[[1]]
[1] 100


$Accuracy
[1] 26.55016

Average distance of the predicted class from true class is :  0.9116591> |
```
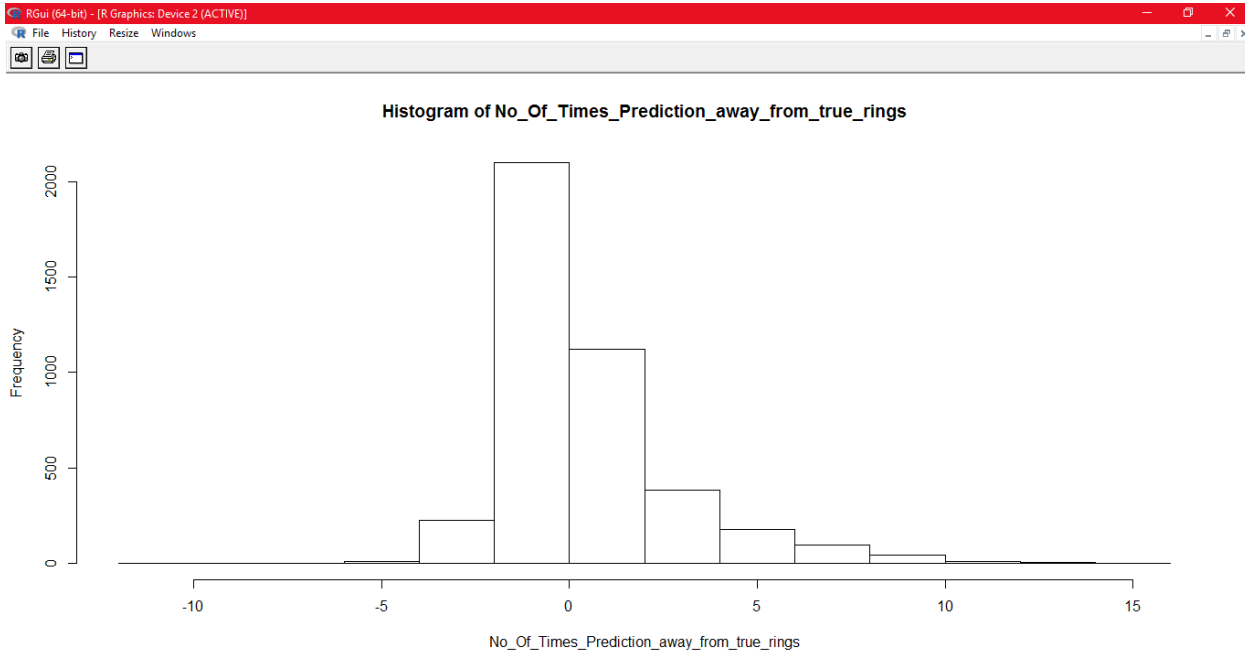

RGui (64-bit) - [R Graphics: Device 2 (ACTIVE)]
File   History   Resize   Windows

Histogram of No_Of_Times_Prediction_away_from_true_rings

Exercise 2 Solution:

```
> func2(datatest)
```

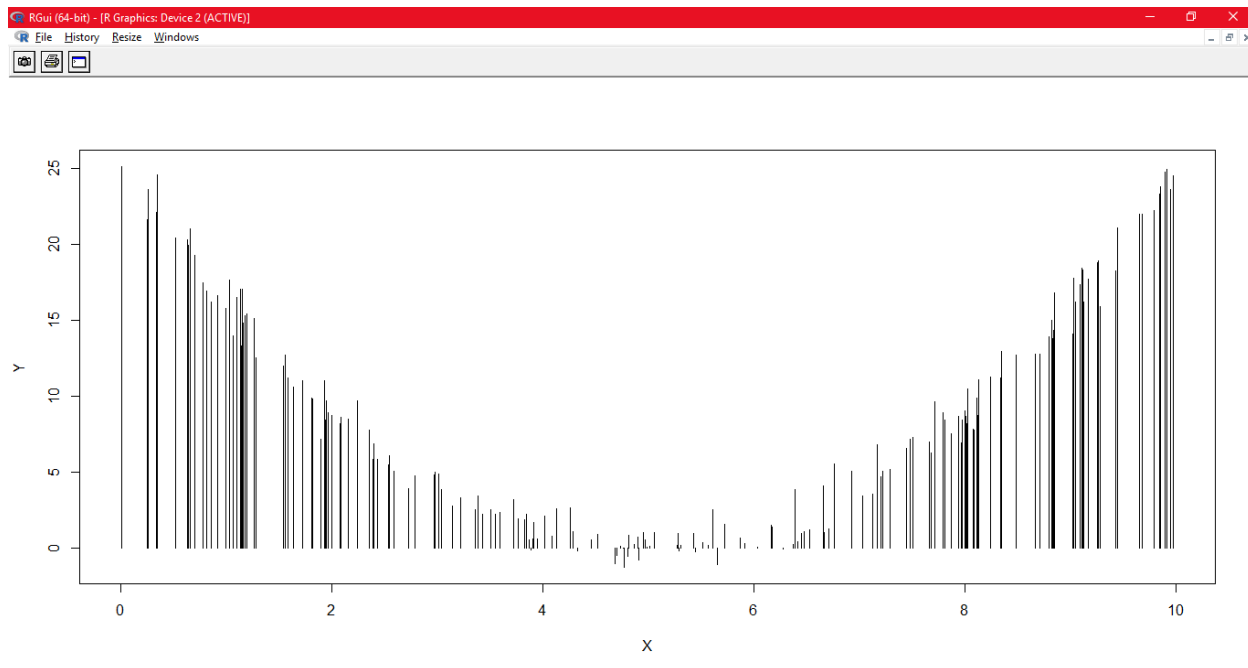|	[,1]	[,2]	[,3]	[,4]	[,5]	[,6]
list	"Description"	"Size"	"Degree of BLP"	"Cost of BLP"	"Average CV accuracy of BLP"	"Training Accuracy with BLP"
accuracy	"Less than 9 VS Greater than 10"	4177	3	100	27.26837	33.68446
accuracy	"Less than or equal to 7 VS 8 or 9"	2096	2	100	46.75573	50.57252
accuracy	"Less than or equal to 5 VS 6 or 7"	839	1	1	55.42312	55.78069
accuracy	"Equal to 8 VS 9"	1257	2	1	64.43914	64.83691
accuracy	"Equal to 6 VS 7"	650	2	100	66.15385	68.15385
accuracy	"Equal to 10 or 11 VS Greater than equal to 12"	2081	2	1	32.0519	32.82076
accuracy	"Equal to 12 or 13 VS Greater than equal to 14"	960	1	10	28.02083	28.85417
accuracy	"Equal to 10 VS 11"	1121	2	100	59.32203	61.8198
accuracy	"Equal to 12 VS 13"	470	3	100	58.29787	74.68085

```
>
```

Exercise 3 Solution:

```
> func3(datatest)
Training Accuracy is:  30.85947
Average distance of the predicted class from true class is :  0.8616232>
```
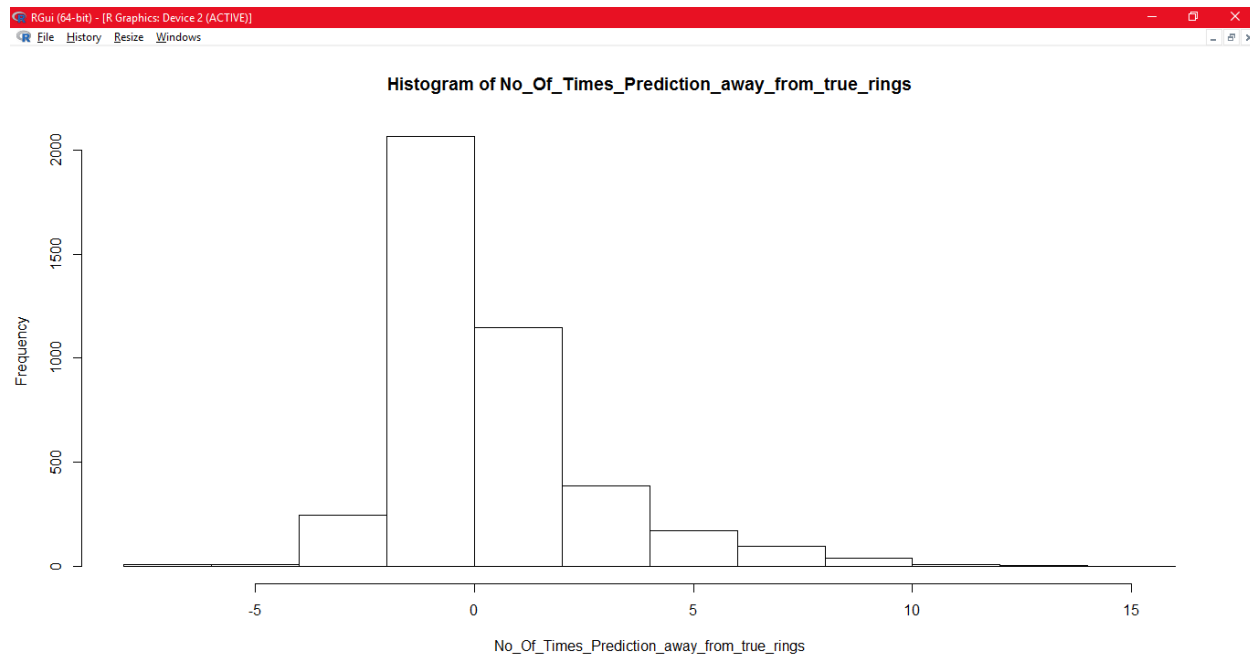

Exercise 4 Solution:
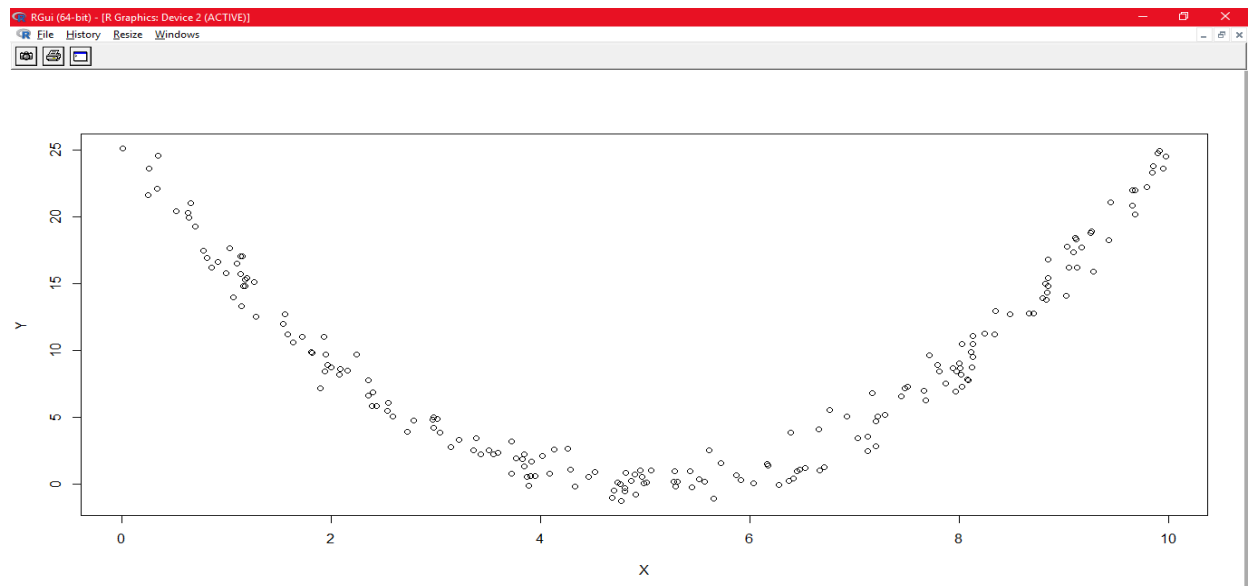
Here we can see that the graph is a parabola, which means that the function is a quadratic function, i.e. the relationship between X and Y is quadratic.

```
> func4(datatest)
       [,1]     [,2]   [,3]      [,4]      [,5]
list "Degree" "Cost" "Epsilon" "CV MSE" "MSE Over entire data"
MSE   2        100    1.5       45.64802 45.45155
MSE   2        100    1         18.18905 18.09163
MSE   2        100    0.1       1.815244 1.75664
MSE   2        10     1.5       45.65532 45.45155
MSE   2        10     1         18.1834  18.09163
MSE   2        10     0.1       1.795935 1.757142
MSE   2        1      1.5       45.64523 45.45155
MSE   2        1      1         18.18709 18.09163
MSE   2        1      0.1       1.795541 1.757081
MSE   2        0.1    1.5       45.60554 45.45155
MSE   2        0.1    1         20.19359 19.65388
MSE   2        0.1    0.1       1.802855 1.768594
[1] "Combination that resulted in Least CV MSE is : "
$Degree
[1] 2

$Cost
$Cost[[1]]
[1] 1


$Epsilon
$Epsilon[[1]]
[1] 0.1


$MSE
        [,1]
[1,] 1.795541
```
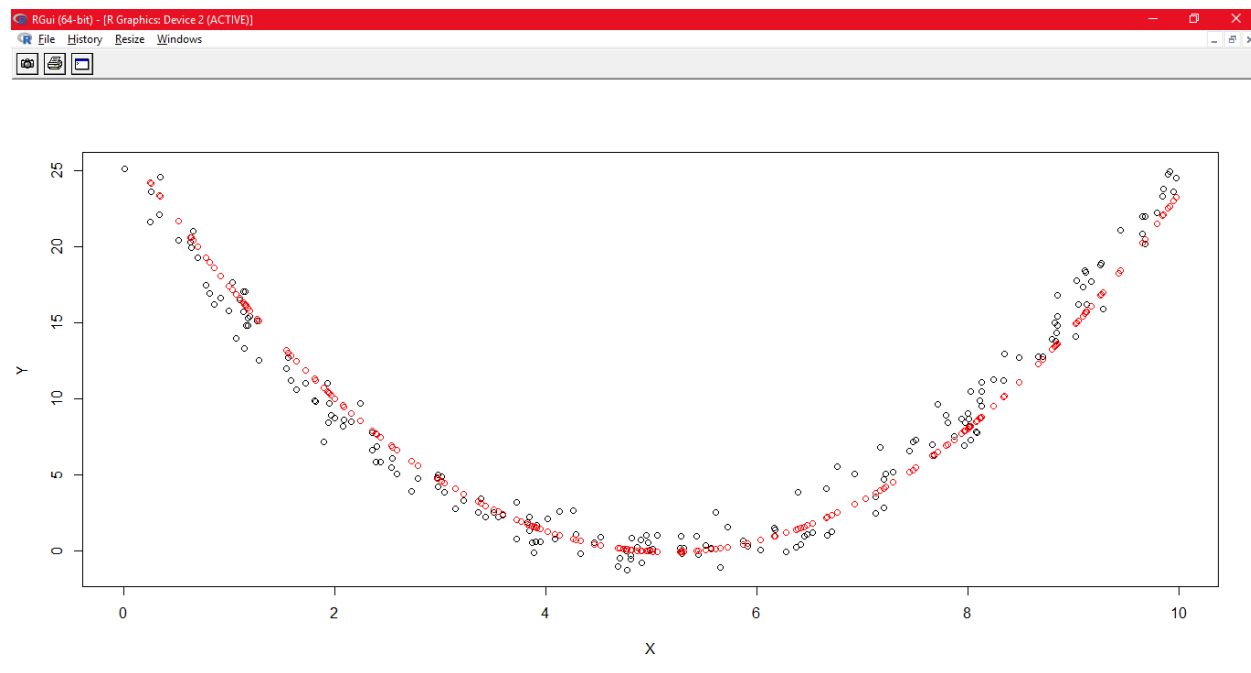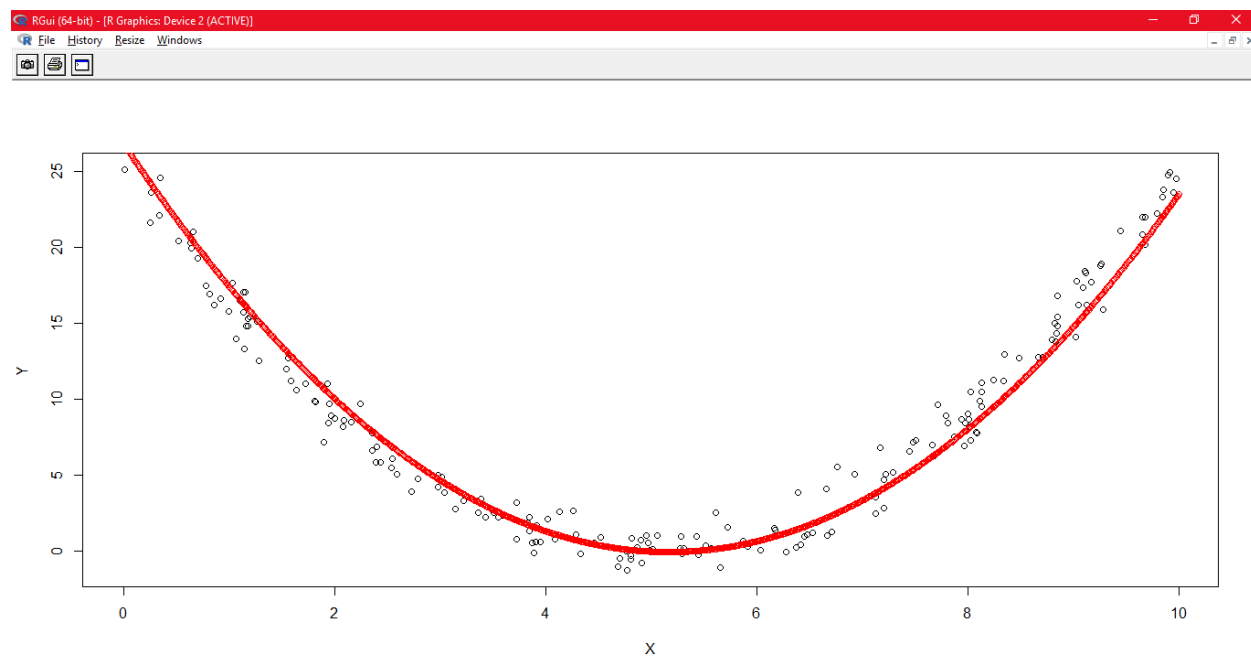
Exercise 5 Solution:

1.graph showing the plotted data points against the curve provided by best svm model

2. plotting the SVM model using 1000 data points equally spaced between 0 and 10.

Exercise 6 Solution:

```
> func6(datatest)
      [,1]     [,2]   [,3]      [,4]
list "Degree" "Cost" "Epsilon" "CV MSE"
MSE   1        100    1.5       7.988384
MSE   2        100    1.5       9.566801
MSE   3        100    1.5       331.3445
MSE   1        100    1         5.506249
MSE   2        100    1         5.005971
MSE   3        100    1         488.7065
MSE   1        100    0.1       5.036108
MSE   2        100    0.1       5.703478
MSE   3        100    0.1       378.8018
MSE   1        10     1.5       8.075637
MSE   2        10     1.5       9.699295
MSE   3        10     1.5       60.24457
MSE   1        10     1         5.483228
MSE   2        10     1         7.092712
MSE   3        10     1         9.167925
MSE   1        10     0.1       5.038571
MSE   2        10     0.1       7.153385
MSE   3        10     0.1       27.96919
MSE   1        1      1.5       8.37252
MSE   2        1      1.5       10.66099
MSE   3        1      1.5       9.937301
MSE   1        1      1         5.628017
MSE   2        1      1         7.022203
MSE   3        1      1         8.415565
MSE   1        1      0.1       5.121059
MSE   2        1      0.1       6.417004
MSE   3        1      0.1       140.7286
MSE   1        0.1    1.5       9.575611
MSE   2        0.1    1.5       10.038
MSE   3        0.1    1.5       11.40486
MSE   1        0.1    1         6.146427
MSE   2        0.1    1         7.107579

MSE   1        0.1    1.5       9.575611
MSE   2        0.1    1.5       10.038
MSE   3        0.1    1.5       11.40486
MSE   1        0.1    1         6.146427
MSE   2        0.1    1         7.107579
MSE   3        0.1    1         8.948045
MSE   1        0.1    0.1       5.386818
MSE   2        0.1    0.1       6.075495
MSE   3        0.1    0.1       7.548832
[1] "Combination that resulted in Least MSE is : "
$Degree
$Degree[[1]]
[1] 2


$Cost
$Cost[[1]]
[1] 100


$Epsilon
$Epsilon[[1]]
[1] 1


$MSE
         [,1]
[1,] 5.005971

Average distance of the predicted class from true class is :  -0.5935955> 
```

Histogram of No_Of_Times_Prediction_away_from_true_rings

No_Of_Times_Prediction_away_from_true_rings