CS 455 - Artificial Intelligence
Homework 4 - Support Vector Machines
Cameron Stark & Dustin Cribbs

Problem 1 - Classification Tasks
- Imported the wine dataset
  LinearSVC
    - Created a LinearSVC model with the C set to 10, and loss set to hinge
    - Transformed the data with the StandardScaler
    - Passed the transformed data and the target to the prediction function
    - Returned the confusion matrix and scores

```
Confusion Matrix:
[[58  1  0]
 [ 1 69  1]
 [ 0  0 48]]
Accuracy Score = 0.9831460674157303
Precision Score = 0.9831460674157303
Recall Score = 0.9831460674157303
F1 Score = 0.9831460674157303
```

  SVC
    - Created SVC model with kernel set to linear and C set to 10
    - Passed data into the StandardScaler to get transformed
    - Passed the transformed data and the target to the prediction function
    - Return the confusion matrix and scores

```
Confusion Matrix:
[[58  1  0]
 [ 0 67  4]
 [ 1  1 46]]
Accuracy Score = 0.9606741573033708
Precision Score = 0.9606741573033708
Recall Score = 0.9606741573033708
F1 Score = 0.9606741573033708
```

Problem 2 - Regression Tasks
- Imported the diabetes dataset
- Print the shape, description of data, and the associated scatter matrix

```
(442, 10)
             age          sex          bmi           bp           s1           s2           s3           s4           s5           s6
min  -1.072256e-01 -4.464164e-02 -9.027530e-02 -1.123996e-01 -1.267807e-01 -1.156131e-01 -1.023071e-01 -7.639450e-02 -1.260974e-01 -1.377672e-01
max   1.107267e-01  5.068012e-02  1.705552e-01  1.320442e-01  1.539137e-01  1.987880e-01  1.811791e-01  1.852344e-01  1.335990e-01  1.356118e-01
mean -3.639623e-16  1.309912e-16 -8.013951e-16  1.289818e-16 -9.042540e-17  1.301121e-16 -4.563971e-16  3.863174e-16 -3.848103e-16 -3.398488e-16
```
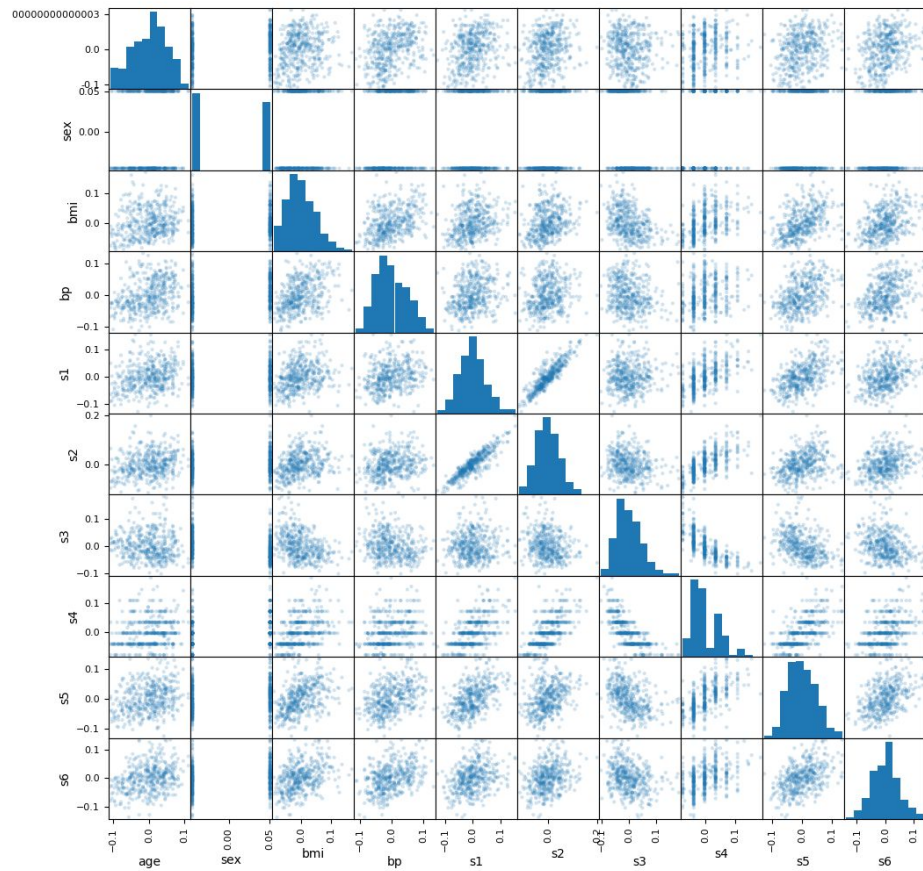
LinearSVR
- Created LinearSVR model with epsilon of 0.1 and pipeline including Polynomial Features with a degree of 3
- Fitted the data and target to the Pipeline
- Plot the Error and the learning Curves
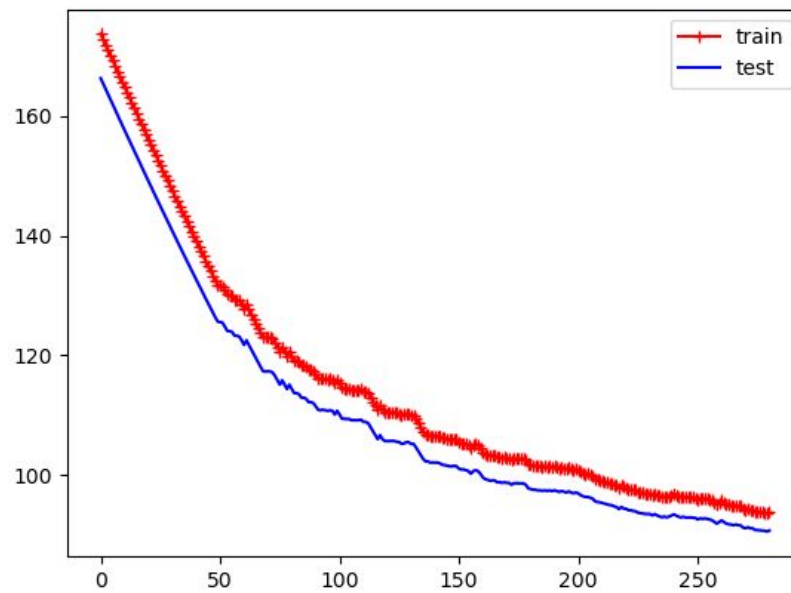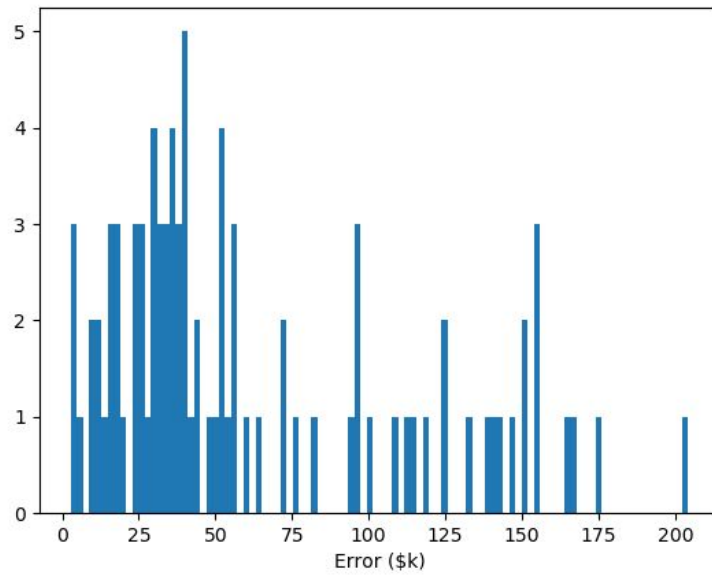
SVR

- ● Created SVR model with kernel set to rbf, epsilon of 0.1, c set to 1 and gamma set to scale
- ● Fitted the data and target to the model and predicted
- ● Plotted Error and learning Curves