1b)
Linear Regression using Polynomial Basis function -
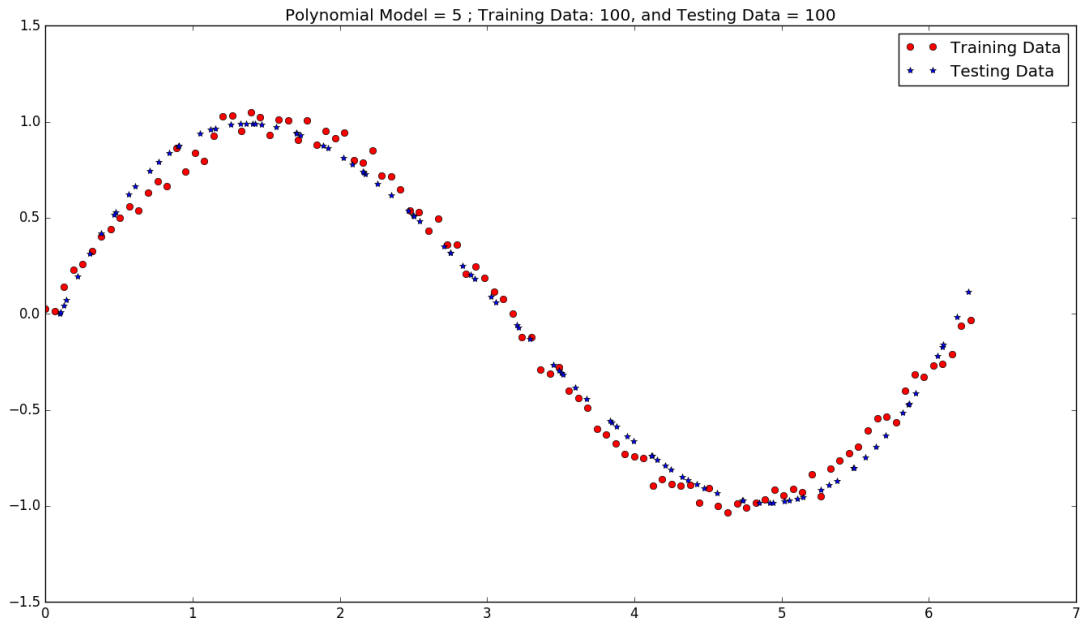
The parameters based on which the output calculation varies in this case is Polynomial model and No.of Training Samples.

- For M = 5

We can observe that as the No.of Training Samples increases, the average error is decreasing which means we are predicting the data more accurately.

Polynomial Model = 5 ; Training Data: 10, and Testing Data = 100

• • Training Data
⋆ ⋆ Testing Data
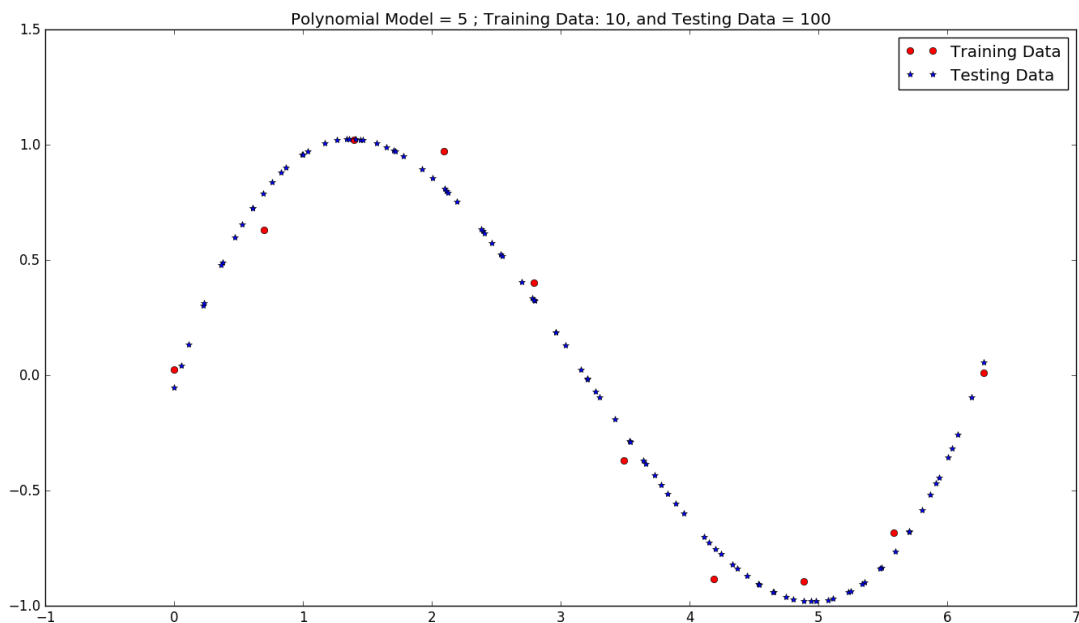
Average error: 0.00756874998773

Polynomial Model = 5 ; Training Data: 100, and Testing Data = 100

Average error: 0.00461535296288

- For M = 10

Even in this case, we can observe that as the No.of Training Samples increases, the average error is decreasing which means we are predicting the data more accurately.
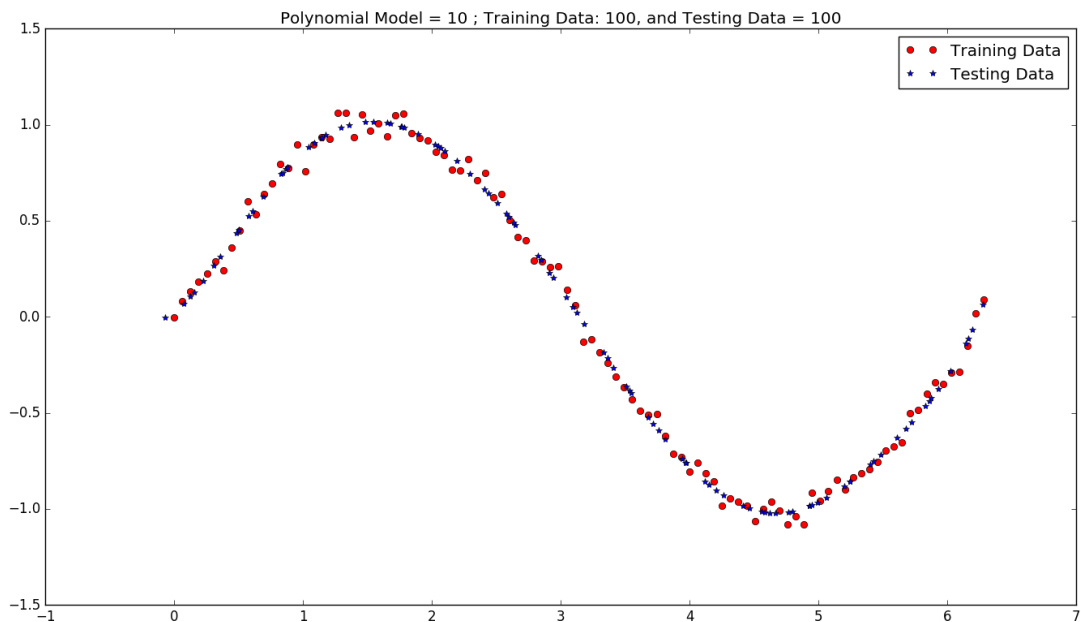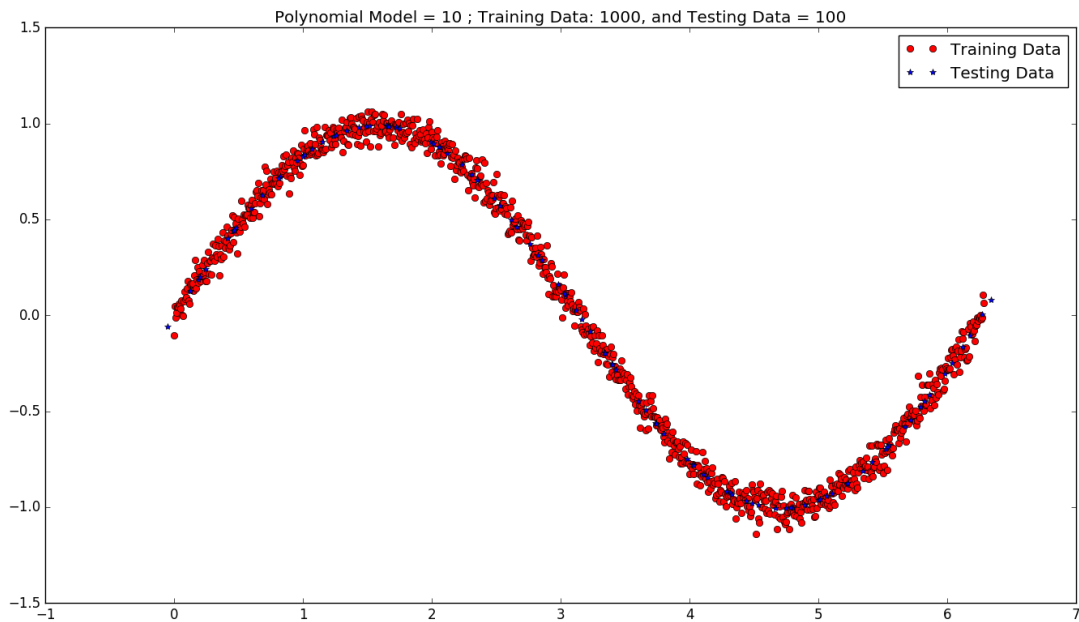

Polynomial Model = 10 ; Training Data: 100, and Testing Data = 100

Average error: 0.000367618437945

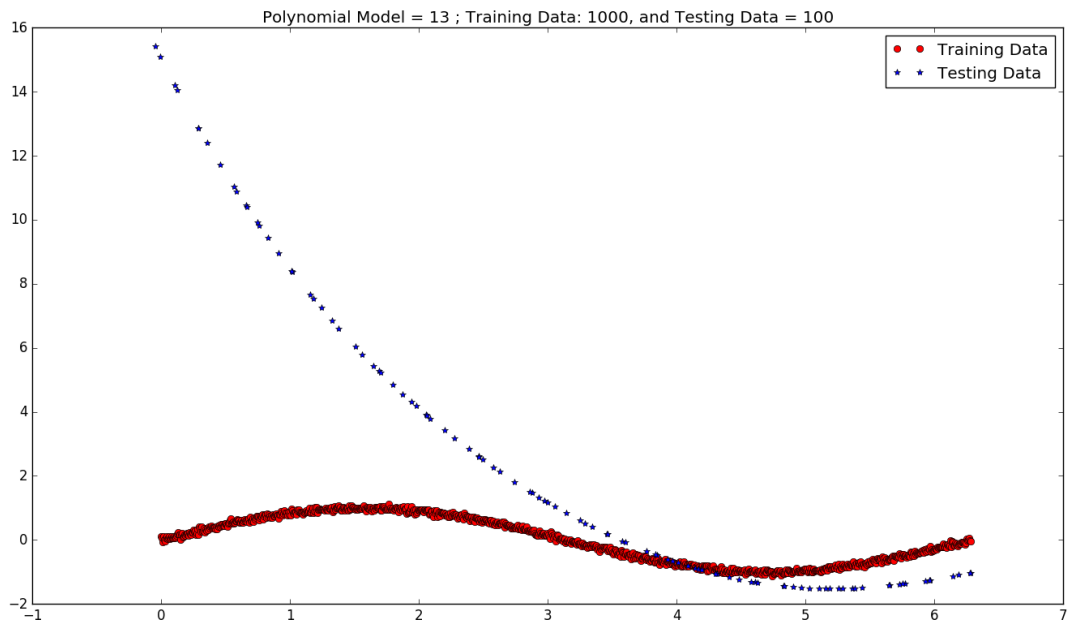Polynomial Model = 10 ; Training Data: 1000, and Testing Data = 100

Average error: 3.50482089856e-05

- For M=13

We can observe from graph and error that the predictions are very random and not accurate. This is because of overfitting of the training data. The test data is giving the random values because of weight values being more than 1 because of over fitting. In such cases, **regularisation** will be useful.
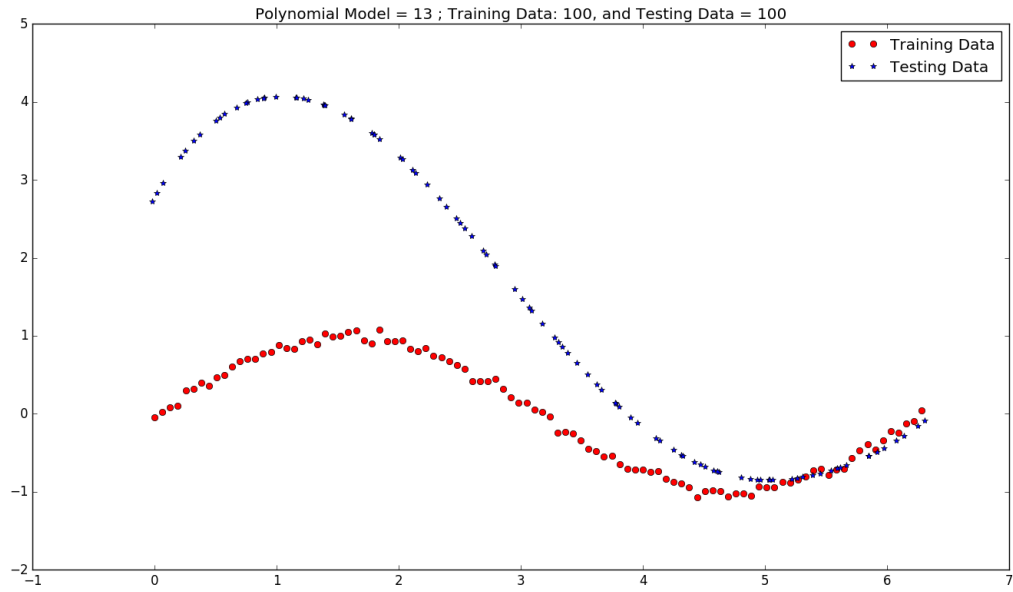
Average error: 3.65822036939

Average error: 27.231387846