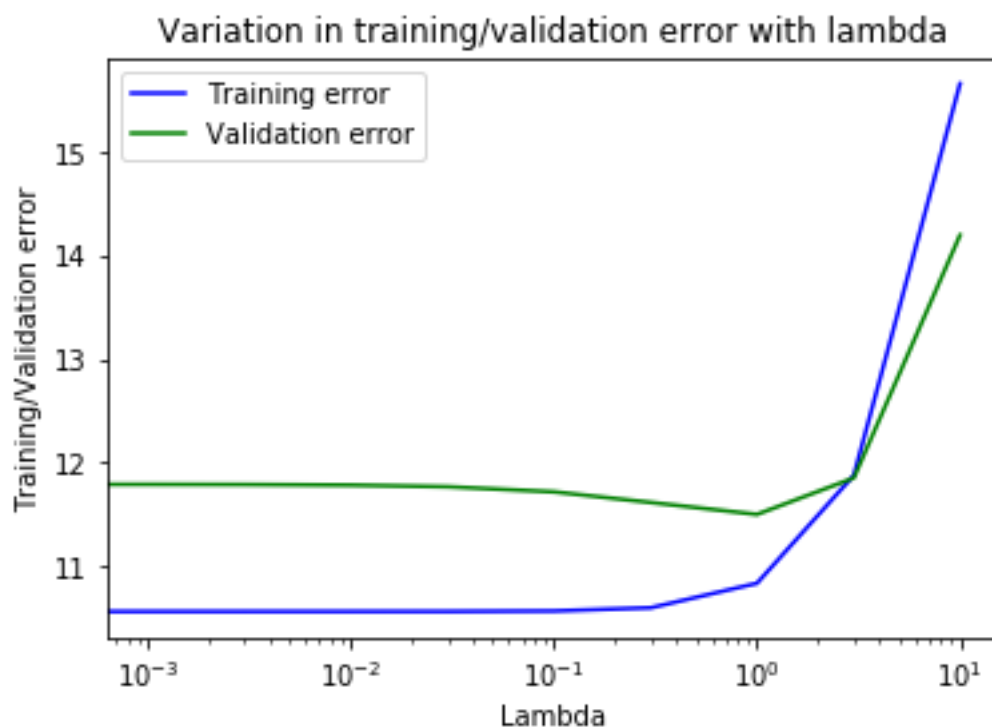**What is the lowest achievable error on the test set with $\lambda=0$?**

The lowest achievable error on the test set with $\lambda=0$ is 12.876

**Select the best value for $\lambda$ and report the test set error with the best $\lambda$.**

Use the previous method. I have used different $\lambda$ values to test the error. From the figure, we can see that when $\lambda = 1$, the validation error is at the lowest.



**What is the test set error with quadratic features with the best $\lambda$ chosen with the validation set?**

Variation in training/validation error with lambda
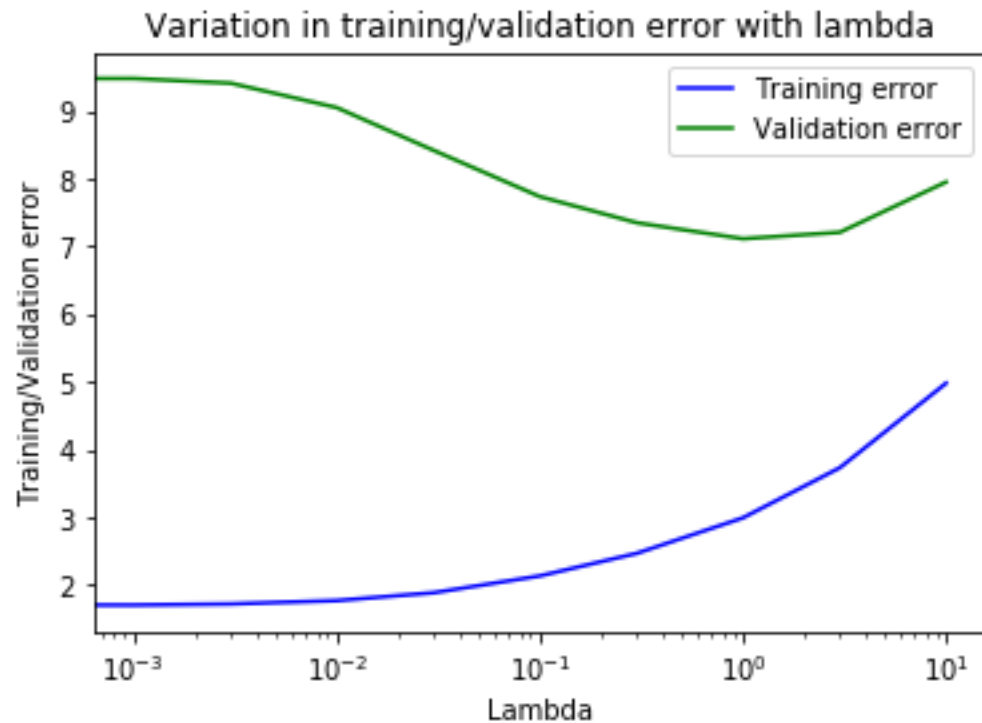
From the figure, we can see that the lowest validation error is at $\lambda = 1$, and the test dataset error is 6.193

**What is the test set error with cubic features with the best $\lambda\lambda$ chosen with the validation set?**

Variation in training/validation error with lambda
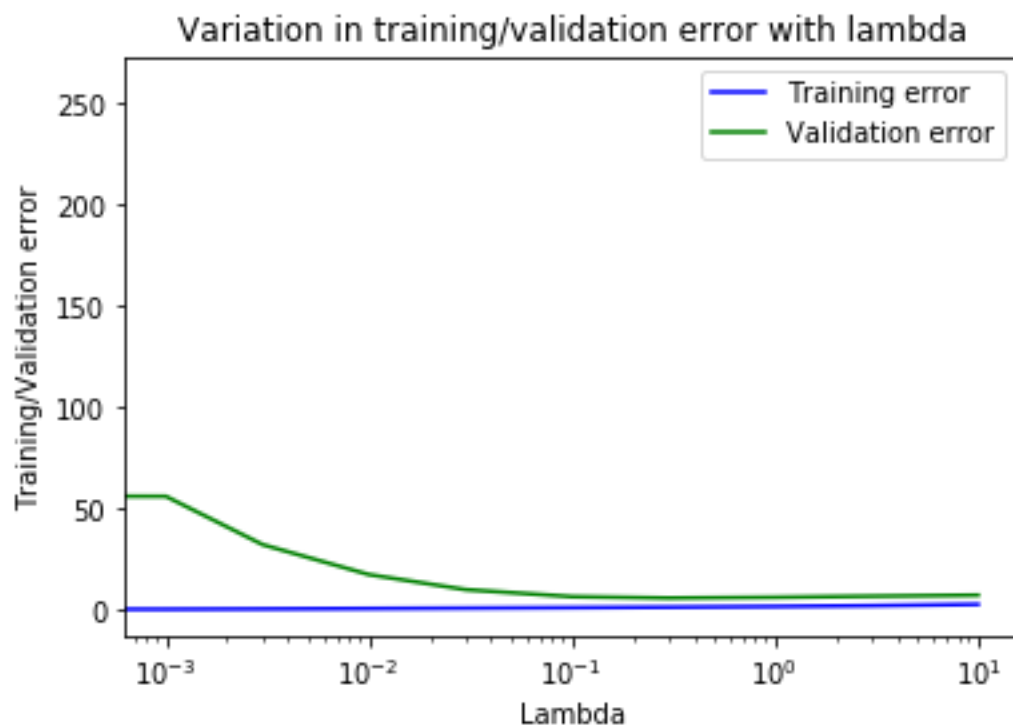
From the figure, we can see that the lowest validation error is at $\lambda = 0.3$, and the test dataset error is 6.94

**Discuss the impact of regularization for building good models for the Boston housing data set**

the regularization term adds a penalty to the loss function. For complex dataset like Boston housing dataset, the regularization can add some variance to the parameters, providing better model.