1. A Walk Through Linear Models

(a)

1. 10: E_train is 0.01%, E_test is 10%

   100: E_train is 0.017%, E_test is 1.2%
2. 10: 5.876

   100: 27.514
3. the error in training and testing will increase, iteration will increase too

(b)

1. E_train is 3.8%, E_test is 4.8%
2. E_train is 13.7%, E_test is 15.1%
3. E_train is 49%, E_test is 54.9%
4. E_train is 5%, E_test is 6.6%

(c)

1. E_train is 0.7%, E_test is 1.8%
2. E_train is 12.3%, E_test is 13.5%

(d)

1. E_train is 0%, E_test is 3%
2. E_train is 0%, E_test is 1%
3. 2.198

2.Regularization and Cross-Validation

(a)

1. 100
2. with regularzation: 0.113 without regularzation: 0.87
3. with regularzation: test error: 6% train error: 0%

   without regularization: test error: 9% train error: 0%

(b)

use $\lambda = 0.001$

with regularzation: test error: 6% train error: 0%

without regularization: test error: 6% train error: 0%

3. Bias Variance Trade-of

(a)

1. T
2. F
3. T
4. F
5. F