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Grade **10.00** out of 15.00 (**67**%)

Question **1**

Correct

Mark 2.00 out of 2.00

Consider the following one dimensional regression problem. If the initial weights are $w_0 = 1$ and $w_1 = 2$ then what is the value of w_1 after one update of weights using gradient descent method. Take learning rate = 0.03. The data is given as:

x	y
1	1
2	2
3	3

Answer: 1.8 ✔

The correct answer is: 1.40

Question **2**

Not answered

Marked out of 1.00

Suppose we have learnt a linear classifier without regularization term for the data that is coming from quadratic function. Further assume that the size of training set is infinity. Then which of the following is true?

Select one or more:

- a. The learnt model will have low bias but high variance
- b. The learnt model will have high variance and high bias
- c. The learnt model will have low variance and low bias
- d. The learnt model will have high bias but low variance

Your answer is incorrect.

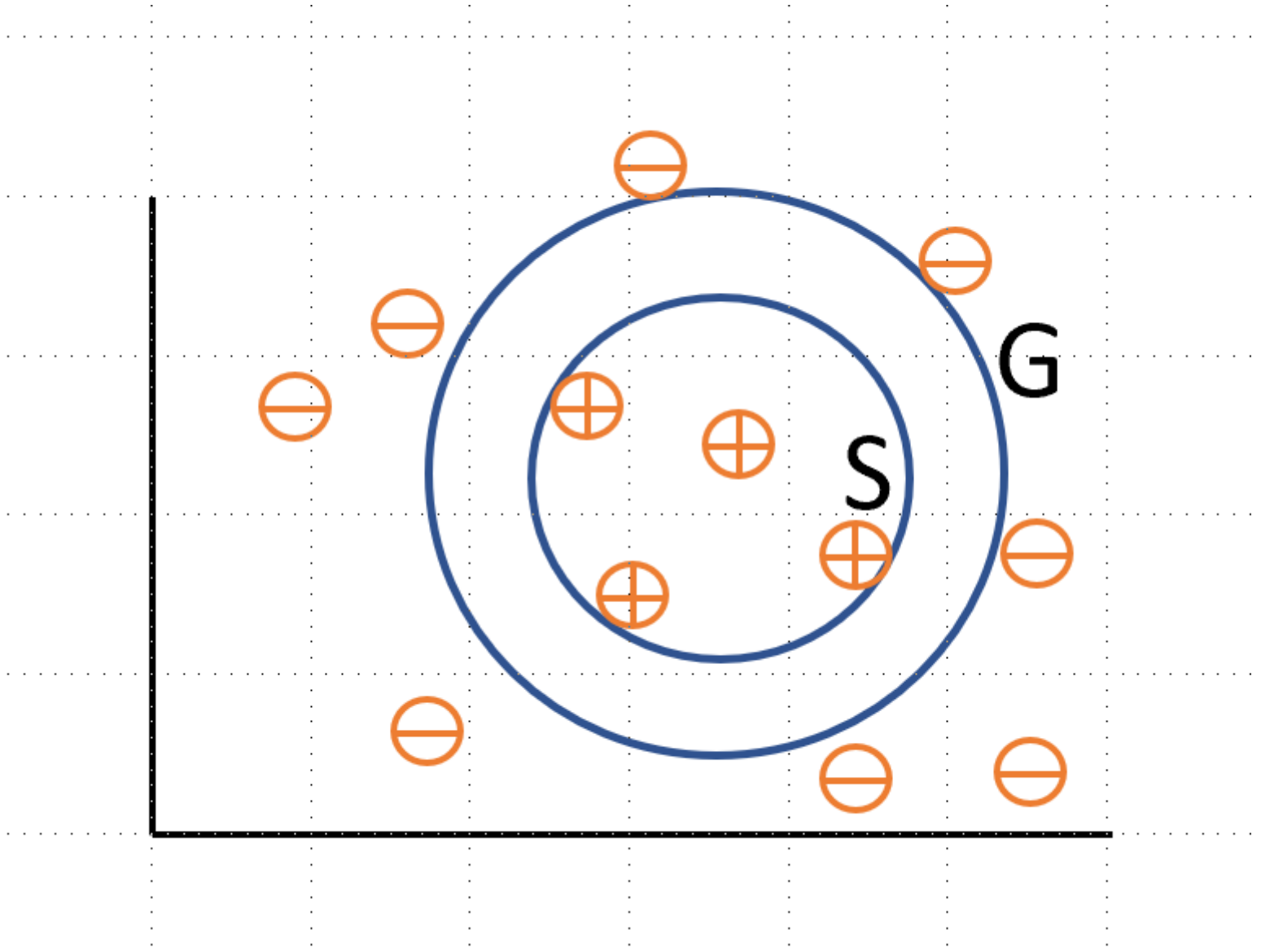
The correct answer is: The learnt model will have high bias but low variance

Question **3**

Correct

Mark 1.00 out of 1.00

Consider a scenario, where a supervisor can give the label of any of the asked example. The observation made in figure has already been made. If you are allowed to ask the labels of more examples, from which region you will prefer to ask these labels so as to learn the classifier with fewer queries possible.



Select one or more:

- a. Region inside S
- b. Region on boundary of G
- c. Region on the Boundary of S
- d. Region outside G
- e. Region between S and G ✔

Your answer is correct.

The correct answer is: Region between S and G

Question **4**

Correct

Mark 2.00 out of 2.00

For the given table, find the information gain at the first split point of the decision tree

Data set for decision tree

Example	Age	Car	Risk
x1	25	Sports	L
x2	20	Vintage	H
x3	25	Sports	L
x4	45	SUV	H
x5	20	Sports	H
x6	25	SUV	H

Answer: 0.459 ✔

The correct answer is: 0.459

Question **5**

Incorrect

Mark 0.00 out of 2.00

Consider a joint distribution P(x,y) for two binary variables as given in the following table. Here, row represent value of x and column represent value of y. Use natural log for the computation.

	0	**1**
0	1/3	1/3
1	0.22	0.11333333333333

Find the value of I[x,y]

Answer: 0.7 ✖

The correct answer is: 0.0117

Question **6**

Not answered

Marked out of 2.00

Consider the following setting where each data point is associated with a weighting factor $r_n > 0$. Sum of the squares error function is then given as:

$E_D(w) = \frac{1}{2}\sum_{n=1}^{N} r_n\{y_n - w^T\phi(x_n)\}^2.$

Further the following dataset in one dimensional case is given as follows: (1, 1.1), (2, 2.8), (3, 3.2). The weight vector is given as $r_1 = 0.2, r_2 = 0.6, r_3 = 0.2$. Further, a two degree polynomial needs to be fit i.e. $\hat{y}(x) = w_0 + w_1 x + w_2 x^2$. Then for the above dataset write the value of w_2 corresponding to optimal w*

Answer: ✖

The correct answer is: -0.65

Question **7**

Correct

Mark 1.00 out of 1.00

Suppose you have learnt the model and figured out that the contribution of variance to the total error is much higher than that of the bias. Then in the ridge regression model, what will you do?

Select one or more:

- [x] a. Increasing training data set size (assuming it is possible)
- [x] b. Increase the value of regularized parameter
- [ ] c. Decrease the value of regularized parameter
- [ ] d. Increase the degree of the underlying polynomial

Your answer is correct.

The correct answers are: Increase the value of regularized parameter, Increasing training data set size (assuming it is possible)

Question **8**

Correct

Mark 2.00 out of 2.00

Given the number of data points are 20 and we are creating 5 datasets using bootstrap technique. Write the probability that a fixed example x belong to all the 5 datasets. Write your answer upto 4 decimal places.

Answer: 0.1086

The correct answer is: 0.1087

Question **9**

Correct

Mark 2.00 out of 2.00

Given the following one dimensional dataset (1, 1.1), (2, 3), (3, 3.2). Find the optimal weight vector w* by fitting a second degree polynomial i.e.$\hat{y} = w_0 + w_1 x + w_2 x^2$. Write only the bias term w_0 in the answer.

Answer: -2.5

The correct answer is: -2.50

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