Q1-1: Are these statements true or not?
(A) The accuracy of a model is the training set accuracy, and its estimator is the test set accuracy.
(B) An unbiased estimator $\hat{\theta}$ always equals to its corresponding true parameter θ.

1. True, True
2. True, False
3. False, True
4. False, False

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(A) The accuracy of a model is the training set accuracy, and its estimator is the test set accuracy.
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1. True, True
2. True, False
3. False, True
4. False, False ⬅

(A) The accuracy of a model should be based on the true distribution. The training set and test set only approximate the true distribution.
(B) An unbiased estimator equals to the true parameter in expectation, which means that they won't always be the same for single estimate but the average of a large number of estimates would well approximate the true parameter. An unbiased estimator just makes sure that there's no systematic error.

Q1-2: Are these statements true or not?
(A) The sample size on the learning curve is the size of test set.
(B) A larger training set would provide a lower variance estimate of the accuracy of a learned model.

1. True, True
2. True, False
3. False, True
4. False, False

Q1-2: Are these statements true or not?
(A) The sample size on the learning curve is the size of test set.
(B) A larger training set would provide a lower variance estimate of the accuracy of a learned model.

1. True, True
2. True, False
3. False, True
4. False, False 

(A) The sample size on the learning curve is for training set.
(B) A larger test set rather than a larger training set does so.

Q2-1: Which of the following is NOT true?

1. Random resampling can tell us how sensitive accuracy of a learning method is.
2. Class proportions are maintained same in the stratified sampling.
3. In leave-one-out cross validation, the number of partition equals to the number of instances.
4. In cross validation, we are evaluating the performance of an individual learned hypothesis.

Q2-1: Which of the following is NOT true?

1. Random resampling can tell us how sensitive accuracy of a learning method is.
2. Class proportions are maintained same in the stratified sampling.
3. In leave-one-out cross validation, the number of partition equals to the number of instances.
4. In cross validation, we are evaluating the performance of an individual learned hypothesis.

In cross validation, we are evaluating a learning method as opposed to a specific individual learned hypothesis.

Q2-2: Please estimate the accuracy of a learning method with the following cross validation.

1. 0.6
2. 0.74
3. 0.8
4. 0.85

iteration	train on	test on	correct on
1	s_2, s_3, s_4, s_5	s_1	12/20
2	s_3, s_4, s_5, s_1	s_2	16/20
3	s_4, s_5, s_1, s_2	s_3	17/20
4	s_5, s_1, s_2, s_3	s_4	12/20
5	s_1, s_2, s_3, s_4	s_5	17/20

Q2-2: Please estimate the accuracy of a learning method with the following cross validation.

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3	s_4, s_5, s_1, s_2	s_3	17/20
4	s_5, s_1, s_2, s_3	s_4	12/20
5	s_1, s_2, s_3, s_4	s_5	17/20

Just take average of 5 tests or
(12 + 16 + 17 + 12 + 17) / (20 + 20 + 20 + 20 + 20) = 0.74

Q3-1: Please calculate the accuracy, error and recall for the following data and prediction.

1. 0.86, 0.14, 0.85
2. 0.85, 0.15, 0.87
3. 0.87, 0.13, 0.85
4. 0.72, 0.28, 0.87

		actual class	
		positive	*negative*
prediction	*positve*	85	13
	negative	15	87

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		actual class	
		positive	*negative*
prediction	*positive*	85	13
	negative	15	87

Accuracy = (TP + TN) / (TP + FP + FN + TN) = (85 + 87) / (85 + 13 + 15 + 87) = 0.86.
Error = 1 – Accuracy = 0.14.
Recall = TP / (TP + FN) = 85 / (85 + 15) = 0.85.

Q3-2: Which two extreme points show the best performance and the worst performance respectively on the ROC curve?

1. (1, 1), (0, 0)
2. (0, 1), (1, 0)
3. (1, 0), (0, 1)
4. (0, 1), (1, 1)

Q3-2: Which two extreme points show the best performance and the worst performance respectively on the ROC curve?

1. (1, 1), (0, 0)
2. (0, 1), (1, 0) 
3. (1, 0), (0, 1)
4. (0, 1), (1, 1)

A ROC curve plots the TP-rate vs. the FP-rate, so usually the x-axis is for FP-rate and y-axis is for TP.-rate When TP-rate = 1 and FP-rate = 0, all instances are correctly classified thus achieving the best result. When TP-rate = 0 and FP-rate = 1, all instances are wrongly classified thus achieving the worst result.