Started on	Wednesday, 29 April 2020, 2:39 PM
State	Finished
Completed on	Wednesday, 29 April 2020, 3:21 PM
Time taken	41 mins 55 secs
Grade	**9.00** out of 10.00 (**90**%)

Question **1**
Complete
Mark 2.00 out of 2.00

Briefly in your own words, describe why we call a sufficient statistic "sufficient." Is there only one sufficient statistic?

A sufficient statistic is "sufficient" in the sense that it captures all of the available information in the sample concerning a parameter. A sufficient statistic needs not be unique. In some cases we can scale a sufficient statistic and get a different statistic that is still sufficient.

Comment:

Question **2**
Correct
Mark 1.00 out of 1.00

We can only use the Factorization Theorem to find a sufficient statistic if the support region does not involve the unknown parameter.

Select one:
- True
- False ✔

Correct.

The correct answer is 'False'.

Question **3**
Complete
Mark 2.00 out of 2.00

Describe the process you would use to show that a particular density belongs to a complete family.

Let an r.v. Z be given whose pdf/pmf belongs to a family of distributions {h(z;\theta)}. To show that the given pmf/pdf belongs to a complete family, we set E[u(Z)] = 0 where u(z) is some function of Z. If the condition E[u(Z)] = 0 requires that u(z) = 0 everywhere except on a set of points that has probability zero for each h(z;\theta), then the given pmf/pdf belongs to a complete family.

E[u(Z)] can be expanded into a sum/integral involving u(z) and the density. We want to show u(z) = 0 for all z (except for points outside the support...).

Comment:

Question **4**
Correct
Mark 1.00 out of 1.00

If a distribution belongs to the regular exponential class, then you can easily determine both the expected value and the variance of the complete sufficient statistic can be determined.

Select one:
- True ✔
- False

Correct.

The correct answer is 'True'.

Question **5**
Correct
Mark 1.00 out of 1.00

Which of the following belong to the exponential class of distributions?

Select one or more:

- [x] a. Normal ✔
- [ ] b. F-distribution
- [x] c. Chi-square ✔
- [ ] d. Uniform
- [x] e. Gamma ✔

Your answer is correct.

The correct answers are: Gamma, Normal, Chi-square

Question **6**
Incorrect
Mark 0.00 out of 1.00

The Rao-Blackwelll Theorem tells us that we can always improve upon (i.e., make the variance smaller) any unbiased estimator by conditioning on a sufficient statistic.

Select one:

- (•) True ✘
- ( ) False

If you condition on a minimal sufficient statistic, you will no longer be able to improve the estimator.

The correct answer is 'False'.

Question **7**
Correct
Mark 1.00 out of 1.00

The Lehmann-Scheffe theorem says that an unbiased estimator that is a function of a complete sufficient statistic is the minimum-variance unbiased estimator (MVUE).

Select one:

- (•) True ✔
- ( ) False

Correct.

The correct answer is 'True'.

Question **8**
Correct
Mark 1.00 out of 1.00

Match each distribution with the appropriate sufficient statistic for theta obtained from the Factorization Theorem.

Poisson(theta)	sum(x1, x2,...,xn)	✔
Gamma(theta, 2)	product(x1,x2,...xn)	✔
Uniform(0, theta)	max(x1, x2,..xn)	✔
Normal(theta, 1)	sum(x1, x2,...,xn)	✔
Normal(0, theta)	sum(x1^2, x2^2,...,x_n^2)	✔

Your answer is correct.

The correct answer is: Poisson(theta) → sum(x1, x2,...,xn), Gamma(theta, 2) → product(x1,x2,...xn), Uniform(0, theta) → max(x1, x2,..xn), Normal(theta, 1) → sum(x1, x2,...,xn), Normal(0, theta) → sum(x1^2, x2^2,...,x_n^2)

◄ Finding MVUEs of functions of parameters

Jump to...

Multiparameter sufficiency ►