Started on	Wednesday, 6 May 2020, 1:29 PM
State	Finished
Completed on	Wednesday, 6 May 2020, 1:57 PM
Time taken	27 mins 52 secs
Grade	**9.00** out of 10.00 (**90**%)

Question **1**
Correct
Mark 1.00 out of 1.00

MVUEs have the invariance property just like MLEs.

Select one:
- True
- False ✔

Correct.

The correct answer is 'False'.

Question **2**
Complete
Mark 2.00 out of 2.00

Describe a useful result that can be proven using Basu's Theorem.

A useful result that can be proven using Basu's Theorem is the fact that the sample mean (X bar) and sample variance (S^2) taken from a Normal(\mu, \sigma^2) population are independent. In particular, X bar is complete sufficient for \mu and S^2 is ancillary for \sigma^2.

Comment:

Question **3**
Correct
Mark 1.00 out of 1.00

Although there are many sufficient statistics, there is only one unique minimal sufficient statistic.

Select one:
- True
- False ✔

Correct

The correct answer is 'False'.

Question **4**
Incorrect
Mark 0.00 out of 1.00

The asymptotic variance of the MVUE cannot be smaller than the asymptotic variance of the MLE.

Select one:
- True
- False ✖

This is false since the MLE is asymptotically efficient.

The correct answer is 'True'.

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

If a distribution has q unknown parameters, then it must have at least q jointly sufficient statistics.

Select one:
- (•) True ✔
- ( ) False

Correct

The correct answer is 'True'.

Question **6**
Complete
Mark 2.00 out of 2.00

Describe the difference between a sufficient statistic and an ancillary statistic in your own words.

A sufficient statistic is one that captures all of the available information in the sample concerning a parameter. Ancillary statistics are those with distributions that don't depend on the parameter(s) of interest and contain no information about them. Ancillary statistics are kind of like the "opposite" of sufficient statistics.

Comment:

Question **7**
Correct
Mark 2.00 out of 2.00

For each statistic, indicate whether it is location-invariant, scale-invariant, or location-scale invariant.

t-statistic	Location-scale invariant	✔
Median	None	✔
min(x_1,x_2,...,x_n)/max(x_1,x_2,...,x_n)	Scale-invariant	✔
Range	Location-invariane	✔

Your answer is correct.

The correct answer is: t-statistic → Location-scale invariant, Median → None, min(x_1,x_2,...,x_n)/max(x_1,x_2,...,x_n) → Scale-invariant, Range → Location-invariane

◄ Basu's theorem and ancillarity

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