

Question 23

Do not write  
in this margin

The following random sample of size 4 was drawn from a population with a continuous uniform distribution on the interval  $0 \leq x \leq \theta$  where  $\theta$  is an unknown parameter.

1.43 8.29 2.30 4.07

- (a) Write down the moment estimate and the maximum likelihood estimate of  $\theta$ .

~~MLE 8.29~~  $\theta_{ML} = X_{\max} = 8.29$   
~~MM 11.045~~  $\theta_{MM} = 2\bar{X} = 8.045$

- (b) Explain why the moment estimate is inappropriate.

~~It is biased.~~  
 One of the values is outside the range.

- (c) In this situation the maximum likelihood estimator is biased and an alternative unbiased estimator is often used. Is the moment estimator biased? Briefly explain why or why not.

[5]

~~Yes~~

No.

The moment estimator is asymptotically unbiased.

~~$E(\hat{\theta}) \rightarrow \theta$  as  $n \rightarrow \infty$~~

$E(2\bar{X}) \rightarrow \theta$  as  $n \rightarrow \infty$