

MATH10282: INTRODUCTION TO STATISTICS
SEMESTER 2
QUIZ PROBLEM 9
(Deadline: Friday 6 May 2022, 11:00am)

Suppose X_1, \dots, X_n is a random sample from a distribution specified by the cumulative distribution function $F(x) = (x/K)^a$ for $a > 0$ and $0 \leq x \leq K$, where a is known. Derive the distribution of $T = \max(X_1, \dots, X_n)$ and use that to show that a $100(1 - \alpha)$ percent confidence interval for K is

- a) $\left[T \left(1 - \frac{\alpha}{2}\right)^{-1/(na)}, T \left(\frac{\alpha}{2}\right)^{1/(na)} \right]$.
- b) $\left[T \left(1 - \frac{\alpha}{2}\right)^{1/(na)}, T \left(\frac{\alpha}{2}\right)^{-1/(na)} \right]$.
- c) $\left[T \left(1 - \frac{\alpha}{2}\right)^{1/(na)}, T \left(\frac{\alpha}{2}\right)^{1/(na)} \right]$.
- d) $\left[T \left(1 - \frac{\alpha}{2}\right)^{-1/(na)}, T \left(\frac{\alpha}{2}\right)^{-1/(na)} \right]$.

This problem is worth 1 mark. Marking scheme: 1 mark if the answer is correct, 0 mark if the answer is incorrect.

Please use Blackboard to enter your answer.