MA204: Mathematical Statistics

Assignment 3

Submit your solutions for 9 questions randomly selected from Q3.1 $\sim$ Q3.19 on pages 156–161 of the textbook "Mathematical Statistics", plus the following question

3.20 Let $X_1, \ldots, X_n \overset{\text{iid}}{\sim} f(x;\sigma)$, where

$$f(x;\sigma) = \frac{x}{\sigma^2} \exp\left(-\frac{x^2}{2\sigma^2}\right), \quad x > 0,\ \sigma > 0.$$

(a) Show that $X_1^2 \sim \text{Exponential}(\beta)$ with $\beta = 1/(2\sigma^2)$.

(b) Find the C-R lower bound of σ.

(c) Find the C-R lower bound of σ^2.