MA204: Mathematical Statistics

Assignment 1

You have a total of 8 questions in Assignment 1.

Submit your solutions for 7 questions randomly selected from Q1.1–Q1.12 in Exercise 1 (pages 53–56) of the Textbook "Mathematical Statistics", plus the following new question

1.13 Let X be a positive random variable with expectation $E(X) = \mu$ and $E(X^2) < \infty$. Assume that $\lambda \in (0, 1)$ is a real number, show that

$$\Pr(X > \lambda\mu)E(X^2) \geqslant (1 - \lambda)^2\mu^2.$$

[Hint: Utilize Cauchy–Schwarz inequality in Theorem 1.5]