

QUEEN MARY, UNIVERSITY OF LONDON

MTH 4106

Introduction to Statistics

Assignment 7

For handing in on 6–7 March 2012

You should attempt all of these questions, as they are designed to help you to learn and understand the material in the course.

The ‘Feedback’ question is the one for handing in. Write your name, student number and group number at the top of your answer before handing it in. Staple all the pages together. Either (i) hand it to your allocated tutor when (s)he asks for it during your allocated Minitab laboratory session on Tuesday 6 March 2012, or (ii) post it in the red post-box on the ground floor of the Maths building before 1400 on Wednesday 7 March 2012.

If you want help on any of the other questions, or want to check that you have done them correctly, you may ask any tutor during your laboratory session or ask me in any of my office hours.

Please do not use Minitab at Queen Mary on Tuesdays except in your allocated hour.

1 The Queen Mary module evaluation questionnaires ask students to indicate their response to each statement using the following scale:

Definitely	Mostly	Neither Agree	Mostly	Definitely
Agree	Agree	nor Disagree	Disagree	Disagree
<input type="checkbox"/>				

- (a) What type of data are the responses to each question?
- (b) Do you think that the response boxes should be ordered in such a way that the left-most box corresponds to the most positive response or in such a way that the right-most box corresponds to the most positive response?
- (c) What is a good way of displaying the responses to each question visually?
- (d) Would the median or the sample mean be more appropriate as a single summary of the responses to one question?

- 2** State and prove Theorem 8 for continuous random variables.
- 3** State and prove Theorem 9 for continuous random variables.
- 4** State and prove Theorem 10 using a method that works for both discrete and continuous random variables.
- 5 (Feedback)** Let X and Y be independent random variables with $X \sim N(3, 1)$ and $Y \sim N(6, 9)$. Put $Z = Y - 4X + 7$.
- (a) State the distribution of Z .
 - (b) Calculate $\text{Cov}(X, Z)$.
 - (c) Calculate $\text{corr}(X, Z)$.
 - (d) Simulate 200 values of X , Y and Z in Minitab and produce a scatterplot of Z against X .