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# Examiners' commentaries 2011

## 04a Statistics 1

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### Important note

This commentary reflects the examination and assessment arrangements for this course in the academic year 2010–11. The format and structure of the examination may change in future years, and any such changes will be publicised on the virtual learning environment (VLE).

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### General remarks

### Learning outcomes

By the end of this course and having completed the Essential reading and activities you should:

- be familiar with the key ideas of statistics that are accessible to a student with a moderate mathematical competence
- be able to routinely apply a variety of methods for explaining, summarising and presenting data and interpreting results clearly using appropriate diagrams, titles and labels when required
- be able to summarise the ideas of randomness and variability, and the way in which these link to probability theory to allow the systematic and logical collection of statistical techniques of great practical importance in many applied areas
- have a grounding in probability theory and some grasp of the most common statistical methods
- be able to perform inference to test the significance of common measures such as means and proportions and conduct chi-squared tests of contingency tables
- be able to use simple linear regression and correlation analysis and know when it is appropriate to do so.

### Planning your time in the examination

You have two hours to complete this paper, which is in two parts. The first part, Section A, is compulsory which covers several subquestions and accounts for 50 per cent of the total marks. Section B contains three questions, each worth 25 per cent, from which you are asked to choose two questions. Remember that each of the Section B questions is likely to cover more than one topic. In 2011, for example, the first part of Question 2 concerned regression and involved drawing a diagram, the second part was a hypothesis test comparing population means using the sample data given. Question 3 asked for a chi-squared test in the first part and questions on survey design in the second part. Question 4 had a series of questions involving drawing diagrams, hypothesis testing and confidence intervals. This means that it is really important that you make sure you have a reasonable idea of what topics are covered before you start work on the paper! We suggest you divide your time as follows during the examination:

- Spend the first 10 minutes annotating the paper. Note the topics covered in each question and subquestion.

- Allow yourself 45 minutes for Section A. Do not allow yourself to get stuck on any one question, but do not just give up after two minutes!
- Once you have chosen your two Section B questions, give them about 25 minutes each.
- This leaves you with 15 minutes. Do not leave the examination hall at this point! Check over any questions you may not have completely finished. Make sure you have labelled and given a title to any tables or diagrams which were required and, if you did more than the two questions required in Section B, decide which one to delete. Remember that only two of your answers will be given credit in Section B and that you must choose which these are!

## What are the Examiners looking for?

The Examiners are looking for very simple demonstrations from you. They want to be sure that you:

- have covered the syllabus as described and explained in the subject guide
- know the basic formulae given there and when and how to use them
- understand and answer the questions set.

You are **not expected to write long essays** where explanations or descriptions of sample design are required, and note form answers are acceptable. However, clear and accurate language, both mathematical and written, is expected and marked. The explanations below and in the specific commentaries for the papers for each zone should make these requirements clear.

## Key steps to improvement

The most important thing you can do is answer the question set! This may sound very simple, but these are some of the things that candidates did not do, though asked, in the 2011 examinations! Remember:

- If you are asked to label a diagram (which is almost always the case!), please do so. Writing ‘Histogram’ or ‘Stem-and-leaf diagram’ in itself is insufficient. What do the data describe? What are the units? What are the  $x$  and  $y$  axes?
- If you are specifically asked to carry out a hypothesis test, or a confidence interval, do so. It is not acceptable to do one rather than the other! If you are asked to find a 5% value, this is what will be marked.
- Do not waste time calculating things which are not required by the Examiners. If you are asked to find the line of best fit, you will get no marks if you calculate the correlation coefficient as well. If you are asked to use the confidence interval you have just calculated to comment on the results, carrying out an additional hypothesis test will not gain you marks.

## How should you use the specific comments on each question given in the Commentaries?

We hope that you find these comments useful. For each question and subquestion, they give:

- further guidance for each question on the points made in the last section
- the answers, or keys to the answers, which the Examiners were looking for
- the relevant detailed reference to the subject guide
- where appropriate, suggested activities from the subject guide which should help you to prepare.

Any further references you might need are given in the part of the subject guide to which you are referred for each answer.

### Question spotting

Many candidates are disappointed to find that their examination performance is poorer than they expected. This can be due to a number of different reasons and the *Examiners' commentaries* suggest ways of addressing common problems and improving your performance. We want to draw your attention to one particular failing – ‘**question spotting**’, that is, confining your examination preparation to a few question topics which have come up in past papers for the course. This can have very serious consequences.

We recognise that candidates may not cover all topics in the syllabus in the same depth, but you need to be aware that Examiners are free to set questions on **any** aspect of the syllabus. This means that you need to study enough of the syllabus to enable you to answer the required number of examination questions.

The syllabus can be found in the ‘Course information sheet’ in the section of the VLE dedicated to this course. You should read the syllabus very carefully and ensure that you cover sufficient material in preparation for the examination.

Examiners will vary the topics and questions from year to year and may well set questions that have not appeared in past papers – every topic on the syllabus is a legitimate examination target. So although past papers can be helpful in revision, you cannot assume that topics or specific questions that have come up in past examinations will occur again.

**If you rely on a question spotting strategy, it is likely you will find yourself in difficulties when you sit the examination paper. We strongly advise you not to adopt this strategy.**