

Mathematics (MEI)

Advanced GCE **A2 7895-8**

Advanced Subsidiary GCE **AS 3895-8**

Reports on the Units

June 2010

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This report on the Examination provides information on the performance of candidates which it is hoped will be useful to teachers in their preparation of candidates for future examinations. It is intended to be constructive and informative and to promote better understanding of the specification content, of the operation of the scheme of assessment and of the application of assessment criteria.

Reports should be read in conjunction with the published question papers and mark schemes for the Examination.

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Chief Examiners' Report

In this series, as always, the Principal Examiners' reports have tried to give teachers information to help them to evaluate the work of their students in the context of the strengths and weaknesses of the overall entry.

Some weaknesses are commonly mentioned: poor recognition and use of 'technical' language and notation, failure to present methods or reasons clearly and failure to set out work clearly.

Any candidate who does not know the meaning of technical words or notation given in the specification is at a great disadvantage. This is obviously the case when this lack of knowledge prevents the candidate from completely understanding what is required but also, poor or inaccurate use of technical terms or notation can impair a candidate's attempt to comment on an answer or explain a method.

Almost all solutions should include a clear indication of the method used. The rubric for each paper advises candidates that 'an answer may receive **no marks** unless you show sufficient detail of the working to indicate that a correct method is being used'. Of course, when candidates are asked to establish a *given* answer, the detail required may be much greater than when the answer is not known.

Good, clear (and compact) display of working helps a candidate produce a coherent argument and reduces the chance of 'slips'. Candidates of all levels of ability can benefit from presenting their work and ideas well and there is often an association between good layout and high quality of work. It is to be hoped that the introduction of Printed Answer Books will encourage candidates to consider more carefully their setting out of solutions.

There are three matters that have been raised about how candidates should use the Printed Answer Books (that will be scanned). The first is that they should put their answers in the correct sections; the second is that they should not try to erase writing or drawing but should cross it out – the scanning process is sensitive and copies the faint images and marks that often are left after attempts at erasure. Finally it should be noted that the use of additional answer sheets should be unusual, and that sheets of rough working should not be handed in.

Note on accuracy in Statistics modules

The Principal Examiners' reports that follow discuss the candidates' performances on the individual modules. There is one matter that should be discussed in a general way as it applies to all the statistics modules. This is in respect of arithmetical accuracy in intermediate working and in quotation of final answers. Please note that these remarks are specific to the *statistics* modules; they do not necessarily apply to other modules, where it may be natural for somewhat different criteria to be appropriate.

Most candidates are sensible in their arithmetical work, but there is some unease as to exactly what level of accuracy the examiners are expecting. There is no general answer to this! The standard rubric for all the papers sums the situation up by including "final answers should be given to a degree of accuracy appropriate to the context". Three significant figures may often be the norm for this, but this always needs to be considered in the context of the problem in hand. For example, in quoting from Normal tables, *some* evidence of interpolation is generally expected and so quotation to four decimal places will often be appropriate. But even this does not always apply – quotations of the standard critical points for significance tests such as 1.96, 1.645, 2.576 (maybe even 2.58 – but not 2.57) will commonly suffice.

Talking now in general terms, the examiners always exercise sensible discretion in cases of small variations in the degree of accuracy to which an answer is given. For example, if 3 significant figures are expected (either because of an explicit instruction or because the general context of a problem demands it) but only 2 are given, a candidate is likely to lose an Accuracy mark; but if 4 significant figures are given, there would normally be no penalty. Likewise, answers which are slightly deviant from what is expected in a very minor manner are not penalised (for example, a Normal probability given, after an attempt at interpolation, as 0.6418 whereas 0.6417 was expected). However, there are increasing numbers of cases where candidates give answers which are *grossly* over- or under-specified, such as insistence that the value of a test statistic is (say) 2.128888446667 merely because that is the value that happens to come off the candidate's calculator. **Such gross over-specification indicates a lack of appreciation of the nature of statistical work and, with effect from the January 2011 examinations, will be penalised by withholding of associated Accuracy marks.**

Candidates must however always be aware of the dangers of premature rounding if there are several steps in a calculation. If, say, a final answer is desired that is correct to 3 decimal places, this can in no way be guaranteed if only 3 decimal places are used in intermediate steps; indeed, it may not be safe to carry out the intermediate work even to 4 decimal places. The issue of over-specification may arise for the final answer but not for intermediate stages of the working.

It is worth repeating that most candidates act sensibly in all these respects, but it is hoped that this note may help those who are perhaps a little less confident in how to proceed.