



## **General Certificate of Secondary Education**

# **Mathematics (Modular) 4302** *Specification B*

**Module 2 Option X 43002X**

# **Report on the Examination** *2007 examination - June series*

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There were further improvements in the work submitted for this series although some of the work received looked very similar and covered similar topics in similar ways. Centres have clearly become more familiar with the tasks and have a better understanding of the criteria, ensuring that the majority of candidates are better prepared.

However, some candidates were disadvantaged by a lack of understanding about the coursework criteria and some centres submitted inappropriate tasks, or else offered work that did not easily allow the criteria to be met. For example, some of the work submitted for the handling data task did not fully address the minimum requirements of the AO4 criteria so could not be supported.

Centres are asked to encourage candidates to show all their working. Candidates need to be told that it is their responsibility to communicate their thinking at each stage of the work. It is not the moderator/examiners' responsibility to try to guess what the candidate was thinking when they wrote their work up and it is not the centre's role to credit work where candidates do not communicate their thinking.

### **Administration**

Most centres were sufficiently well organised although a number of centres failed to meet the AQA-set deadlines for the submission of coursework. Some centres did not use the latest Candidate Record Forms or else failed to complete all the required information on these forms, especially information such as centre numbers and candidate numbers.

Similarly, teacher and candidate authentications are essential to confirm that the work is the candidate's own. Authenticating the work was problematic in some centres resulting in work having to be returned and authentications sought, thus slowing down the process and reducing the time available to moderators and examiners.

Centres are reminded that:

- *deadline dates are not optional and should be adhered to except in special circumstances with the agreement of AQA*
- *all work submitted must be authenticated by the teacher/lecturer as well as the candidate - arrangements may need to be made to ensure that this happens*
- *sufficient work must be undertaken under the direct supervision of a teacher/lecturer for the work to be confidently authenticated*
- *task starters and/or any other material used (for example writing frames, help sheets or marking schemes) should be forwarded with the coursework for information*
- *centres devising their own assessment criteria should ensure that these criteria are specifically referenced to the original coursework criteria*
- *coursework presented should be sequenced with page numbers and should identify candidate details on each page*
- *the use of plastic wallets and elaborate folders to contain coursework is actively discouraged and treasury tags should be used to bind work together.*

The following comments are offered under each of the three strands.

### **1. Specifying the problem and planning**

This strand is about choosing a problem and deciding and planning what needs to be done. The strand requires the candidate to provide clear aims, consider the collection of data (sample size and sample method), identify practical problems and explain how they might overcome them. For the higher marks, candidates need to decide upon a suitable sampling method, explain what steps were taken to avoid possible bias and provide a well-structured report.

### **2. Collecting, processing and representing the data**

This strand is about collecting data and using appropriate statistical techniques and calculations to process and represent the data. Diagrams should be appropriate and calculations (mostly) correct. For the higher marks, candidates need to accurately use statistical techniques and calculations from the Higher tier GCSE Mathematics specification content and also, essentially, give reasons for their inclusion.

### **3. Interpreting and discussing the results**

This strand is about commenting, summarising and interpreting data. The discussion should link back to the original problem and provide an honest evaluation (strengths and weaknesses) of the work as a whole. For the higher marks, candidates need to provide sophisticated and rigorous interpretations of their data and provide an analysis of how significant their findings are.

The following additional comments from moderators' and examiners' reports might be useful to centres in preparing candidates for the handling data coursework.

#### **Specifying the problem and planning**

- *Greater consideration needs to be given to sampling and why, for example, 30 people or 100 words might be an appropriate sample size.*
- *Centres are reminded that stratified sampling is not always appropriate and reasons for choosing a particular sampling method should be explained.*
- *Insufficient detail was often given of how the sampling was actually undertaken in order to avoid bias and ensure that the sample was truly representative.*
- *Many of the hypotheses set were inappropriately focussed on calculations, for example, "the mean length of words in tabloids is smaller than the mean length of words in broadsheets".*
- *The best hypotheses were generic and easily allowed candidates the opportunity of refining, extending and developing their work.*
- *An award of mark 5 can only be given if the task is substantial and developed beyond the original task at a level commensurate with grade C.*
- *Evidence for this strand might additionally be seen later in the work as the candidate revisits and develops his/her own hypothesis.*
- *Databases, where used, should be sufficiently large to allow sampling to take place and provide a variety of possible extensions to the original task.*
- *For the higher marks, work requires careful specification and evidence of extensive, independent thought.*
- *Candidates should be encouraged to make greater use of pilot surveys, control groups and pre-testing as appropriate to the task.*

### **Collecting, processing and representing the data**

- *Calculations and representations need to be considered for their relevance to the problem as statistics for the sake of statistics gains few marks.*
- *Statistical representations and calculations (especially cumulative frequency diagrams and box plots) add little to the task unless their inclusion is explained and the outcomes interpreted.*
- *Candidates should appreciate the purposes of different representations and understand that, for example, measures of spread are not appropriate to compare the lengths of words in a sentence.*
- *Many representations were too small or inaccurate to provide useful information. Calculations and representations should be accurate and suitable for their purpose.*
- *Cumulative frequency diagrams are most appropriate for continuous and/or grouped data.*
- *The use of techniques such as standard deviation and rank correlation are not indicators for the higher marks unless they are appropriate, explained and interpreted.*

### **Interpreting and discussing the results**

- *Too often, conclusions made little use of the calculations and representations provided and were not always related back to the original hypothesis.*
- *Suggestions that the hypothesis is proven or not proven need to be backed up and explained using evidence from the candidate's own work.*
- *Candidates are now showing evidence of evaluating their strategy focussing on each aspect of their work.*
- *Simplistic evaluations such as those suggesting the use of a bigger sample need to explain why or else consider other possible areas for improvement.*
- *Comments on representations and calculations were too often descriptive eg "the distribution is negatively skewed" without interpreting this in terms of the hypothesis.*
- *For the higher marks, candidates must recognise possible limitations to their strategies.*

### **Further support**

Additional support is provided through the AQA network of coursework advisers. Further details about standardisation meetings and coursework advisers can be obtained by contacting the AQA (Manchester) office.

### **Option T – Teacher-Assessed**

The tasks set were mostly appropriate and allowed candidates to make some progress against the assessment criteria. AQA-set tasks were still popular with *Read All About It* a particular favourite for many centres. However, centres made use of a wider range of tasks including personal statistics presented in databases and the *Where in the World* task which offered many opportunities for candidates to pursue cross-curricular work with geography and citizenship.

The wider range of tasks offered allowed candidates a bigger choice of topics thus allowing them to feel greater ownership of the task. This often resulted in more interest being shown in the task and, inevitably, higher marks as a result of their enthusiasm and engagement. The greater flexibility is also, perhaps, indicative of centres' growing confidence with the Handling Data coursework.

Centres are asked to note that the provision of the original mark schemes for the AQA-set tasks was intended to provide suggestions for possible routes through these tasks. The teachers' notes in the right-hand column are not intended as a replacement for the minimum requirements and original criteria against which all tasks should be used when assessing coursework.

Mark schemes produced prior to 2003 and mark schemes from other awarding bodies often caused problems where centres took insufficient notice of the original criteria. Centres are advised to contact their coursework adviser if they are not sure about the suitability of mark schemes being used.

Similarly, tasks produced prior to 2003 and tasks from other awarding bodies also caused problems especially where tasks were over prescriptive or else the tasks were not suitable for candidates on the Higher tier. Again, centres are advised to contact their coursework adviser if they are not sure about the suitability of tasks being used.

Centres are reminded that all coursework submitted under Option T **must** be suitably annotated to explain how work has been assessed and how marks have been arrived at. This information is usually included on the Candidate Record Form under the heading of key evidence. Any other information to explain a candidate's thinking will be considered by the moderator in the assessment of the work.

Finally, moderators reported that a small number of centres were not undertaking sufficient internal moderation to ensure that the work submitted produced a valid rank order. Regular internal moderation opportunities are essential to keep staff (especially new staff and part time staff) up to date with the additional exemplification offered and ensure that marking is consistent across all staff in each examination session.

### **Option X – Externally-Assessed**

The AQA-set tasks allowed candidates the opportunity to make some progress against the assessment criteria and thus gain credit for their performance. Again, the most popular tasks were *Read All About It* and *Guestimate*. In most cases, however, the tasks were rarely extended beyond the original to produce a substantial task. In particular, too much work in the *Guestimate* task concentrated on the guesses rather than the errors.

*Pulse Rates* and *Reaction Times* were less favoured, presumably due to the amount of time required to set up the experiments to collect data. Centres' attention is drawn to the *Census at School* website at [www.censusatschool.ntu.ac.uk](http://www.censusatschool.ntu.ac.uk) where candidates may collect data on reaction times from a database. Similarly databases for *Guestimate* and *Where in the World* can be found at <http://www.censusatschool.ntu.ac.uk/aqa/>

Care should be taken to ensure that candidates are actively discouraged from following similar 'pathways' making use of similar representations and calculations. It was often difficult to differentiate between the responses of different candidates except where centres provided additional comments to explain. Sampling should ensure that candidates are making use of different data sets.

Annotation is not required for coursework submitted under Option X but any information provided by the teacher/lecturer about how the task was undertaken or any comment to explain a candidate's thinking will be considered by the examiner in the assessment of the work.

## **Mark Ranges and Award of Grades**

Grade boundaries and cumulative percentage grades are available on the <http://www.aqa.org.uk/over/stat.html> page of the AQA Website.