

Mathematics Information Booklet 5, Spring 2006

The following notes and general information are prepared for Heads of Mathematics at schools and colleges who enter candidates for Edexcel Entry Level Certificate, GCSE and GCE (AS and A-Level).

For details of Key Dates, how to make entries, timetables, and coursework mark transfer arrangements, please consult the Edexcel Information Manual, which is sent to Examinations Officers at all Edexcel centres. Coursework record forms for GCSE Mathematics, GCSE Statistics and Entry Level Certificate can be downloaded, and the content of previous Information Booklets can be viewed, on our website at www.edexcel.org.uk.

1. GCSE Mathematics

For the latest news on the development of 2-tier GCSE mathematics, please keep checking our website.

2. Final Timetables Summer 2006

<u>Date</u>	<u>AM</u>		<u>PM</u>
Mon 22 May	6663 - Core Mathematics 1 6664 - Core Mathematics 2	-	-
Wed 24 May	-	-	6683 - Statistics 1 6689 - Decision Mathematics 1
Mon 5 June	-	-	<i>GCSE Mathematics Papers 1, 3, 5, 14, 16, 18</i>
Tue 6 June	-	-	6677 - Mechanics 1 6678 - Mechanics 2
Thu 8 June	6684 - Statistics 2 6690 - Decision Mathematics 2	-	-
Mon 12 June	<i>GCSE Mathematics Papers 2, 4, 6, 15, 17, 19</i>	-	6665 - Core Mathematics 3 6679 - Mechanics 3
Thu 15 June	-	-	6666 - Core Mathematics 4 6680 - Mechanics 4
Mon 19 June	6667 - Further Pure 1 6691 - Statistics 3	-	-
Wed 21 June	-	-	6668 - Further Pure 2 6686 - Statistics 4
Thu 22 June	<i>GCSE Statistics - 1389/1F/1H</i>	-	-
Fri 23 June	6669 - Further Pure 3 6681 - Mechanics 5	-	-
Fri 30 June	-	-	9801 - AEA Maths

3. Edexcel online

Edexcel Online is an invaluable service for administrators providing support at every stage of the qualification cycle, from approval through to registration and entry, reporting of achievement and results and post results services. What's more, new services such as onscreen support for centre assessors and detailed feedback on results mean that it now has a lot to offer teaching staff, too!

Getting started with Edexcel Online is quick and free and recent changes mean that it's now even more flexible, allowing you to set up new users with the access that suits you. Our support staff are on hand to answer your queries on 0870 240 9819 - or why not try our online customer enquiry service, Ask Edexcel at www.edexcel.org.uk/help? Log in at www.edexcelonline.org.uk and start enjoying the benefits today.

NEW Results Analysis Service: access the new Results Analysis Service to view question by question marks for your candidates in selected summer 2005 papers. For more information on how to use this service, see below.

Question Results Analysis Guidance

Getting Started

Log into EOL using your centre number. Select the qualification which you want to look at - GCSE/GCE. Click on the Results Analysis tab on the left hand menu. You can then select to view your results by question or by Student.

To view a report, you will need to select the Examination Series (June 2005 for this summer's results), the Specification and the Paper from the drop down menus on the screen. Remember that we are only able to offer Results Analysis for papers that have been marked online and so not all specifications and papers are listed. Once you have chosen what results you would like displayed, you have a number of different reports that you can access.

What reports are available 'By Question'?

(i) *Your centre's average mark compared with the national average*

To select this option, select the Average Performance at question level report type and click Submit

The results table will show the average mark achieved for each question in your centre, the total mark for the question and the national average. This will give you an overview of how your students performed on each question against other candidates across the country. Please note that the term "average" as used in Results Analysis means the sum of all the candidates' marks (in a centre, in a group of centres or nationally depending on the report type) divided by the number of candidates.

For a number of papers, where the questions have been subdivided, the sub-questions have been grouped and marked online together. This means that, for these papers, the average and maximum marks supplied are by a group of questions rather than for each individual sub-question. Where this is the case, it will be indicated in the question name column.

e.g. Q1ac followed by Q1de means that the first three (a-c) and the last two(d-e) subsections have been marked together. This means that the maximum mark and the averages are based on these groupings.

(ii) *Your centre's results compared to those of other centres*

Select average performance at question level and a centre type, click on submit and you will see the average performance of other schools and/or colleges in the chosen category. This enables you to compare your centre's performance against that of similar or different types of educational institutions.

(iii) *Your centre's mark distribution for each question*

Select the report type Centre Mark Distribution for each question from the drop down menu and click submit. You will then see a report showing how many candidates achieved each mark for a question.

What reports are available 'By Student'?

(i) *Each of your students' marks for each question*

From the Results Analysis menu, select 'By Question' and then enter your centre details, the session, subject and paper. You will then see a list of all the questions on the paper. Click on the question number that you are interested in. You will then see a report listing the names of all of the students from your centre and how they performed in this question compared to the national average.

(ii) *Individual student breakdown for the whole paper*

From the report above, you can then drill down to look at how an individual student performed across the whole paper. By clicking on the relevant name, you will then see a report which compares the student's score for each question compared to the national and centre average.

How can I display this information?

At the bottom of the screen, below the table of data you have requested, you will see a number of buttons. These give you a number of options for ways of presenting the information and links to related material. If you hover the mouse over these buttons, a text box appears which explains what the buttons do.

Show Graph enables you to see the information presented in the report in graph form. This option is only available for the Results Analysis - by question route. The colours of the graph are randomly generated each time you use this feature

Export Data allows you to see the information in the report in the form of a spreadsheet. In the 'by student' report data, there will be a column with the gender of the candidate. There is also a blank column which allows you to enter the students class/ set group. This will allow you to sort your students by gender and teaching class.

Examination paper and *mark scheme* provide you with links to these documents to remind you of the questions as well as being able to look at the performance data in relation to the mark scheme

Examiner comments are taken from the main Principal Examiner report and will provide you with the key features of the candidates performance for this year to give you a general context against which you can view the results. The full Examiners' Report will be available in the Autumn term.

How can I use this information?

This data can be used to pinpoint your students' relative strengths and weaknesses. For example, if questions 8, 9 and 10 relate to a particular area of the specification and your centre's average is particularly high compared to the national average, this reflects an area of the specification that is well taught.

Using the 'by Student' pathway, you can drill down further to see how each class or teaching group has performed on certain questions.

In summary, this feedback service is intended to assist you to:

- Analyse your centre's results in each of the papers for each of the questions
- Identify the strengths and weaknesses of your candidates for each question within the paper
- Sort your data into gender and class to analyse performance
- Identify trends in your students' performance on particular questions
- Produce reports on the outcome of the examination
- Use the mark schemes and question papers to identify trends in performance to areas of the specifications which candidates find easy or difficult to grasp
- Plan teaching and learning in the coming year

4. Coursework - what happens to it?

Centres have the following options for coursework (1387/88)

- 5507/7A - Teacher assessed - Edexcel moderated coursework
- 5507/7B - Edexcel (Board marked coursework)

In previous years we have received various queries regarding the coursework options, and we hope the points made below will clarify the difference between 5507/7A and 5507/7B.

Coursework 5507/7A is teacher assessed coursework where the centre will mark all candidates' work and Edexcel will request a sample. The centre's sample will be moderated against the national standard. If the marking is found to be outside the predetermined tolerance (± 3) then an adjustment may be necessary to bring the marking in line with the national standard. The decision on an adjustment is made by Edexcel, not by the individual moderator.

At the end of the moderation centres, will receive a E9 report from the moderator which has also been checked by a senior moderator. The report is intended to be a summative report on the findings of the moderator based on the coursework sample as a whole. It is not intended to be a report based on individual candidates' work: the E9 should be read in conjunction with the principal moderator's report, which can be viewed on our website. The samples will be sent back to centres once the moderation has been completed unless work has been retained by Edexcel for use in Awarding or for training purposes. In this case centres will notified by the moderator in writing.

Board marked coursework 5507/7B is treated as a script. Centres send all candidates' work to the examiner. The work is marked using the specified published mark scheme. There is no tolerance allowed for this option, the moderators mark will count as the final mark. Once the work has been marked the work will be sent back to Edexcel by the examiner. If centres wish to have the work returned to them then they will have to make a request. There is a deadline for this request and a cost is involved per script. Details of the Post-Results service can be obtained from your Examinations Officer.

Centres will not receive a E9 report for 5507/7B option as the coursework has not been moderated.

Centres have been sent lists of project and tasks for 5507/7A and 5507/B. For board marked coursework, 5507/7B, only the following tasks and projects are acceptable.

- Borders
- The Fencing Problem
- Number Stairs

- Newspaper Comparison
- Mayfield High School

Examiners marking the work will only accept coursework from the list above.

5. New Support for teaching

GCSE Maths

Edexcel is not just the largest qualifications body but the leading body for Maths. At present we service approx 3000 Schools and Colleges our Maths specification and support.

Edexcel approach to Maths

The reason for such a high number of learning institutions selecting Edexcel is the level of support, accessibility and proven success we offer our centres.

Our philosophy is to offer all our centres a straightforward approach, to be engaging, motivational and of course accessible. We want to ensure that we can help you achieve the best results you can from your students and allow you more time in the class room to ensure you meet your targets and achieve the best results you can.

We promise to give you the best most reliable support possible, and the reason we are always revising our offer and service to you.

So what kind of support does Edexcel offer?

- Papers are set by mathematics teachers, with language experts ensuring that we are testing mathematics rather than language skills
- Project and tasks with teaching and marking guidance making the coursework burden less and more manageable for teachers
- Guides are provided for use of by teachers: ICT, coursework and schemes of work
- Endorsed textbooks are provided from publishers in partnership with Edexcel
- Electronic resources are available from Edexcel; The Data handling tool, Exam wizard and Exam Tutor.
- Consistently good results for their students
- Common coursework for GCSE mathematics and GCSE statistics
- Dedicated Maths hotline to answer your specific questions and provide you with further information and guidance and support from our maths team.
- All year round information events and professional development events.

The New Maths Specification for 2006

The reason we can do this is that 2006 sees a new Maths specification and we want to ensure we give as much support as we possibly can. These changes will be a smooth transition for our existing centres.

We hope you will appreciate the importance and emphasis we feel necessary to ensure we provide you with a comprehensive service and set us apart from other awarding bodies - We know we cannot offer a different specification but we know we can provide you with a first class support service to ensure your students' success and your centres' success.

6. GCSE Statistics - from Gill Dyer, Chief Examiner

The new Edexcel GCSE Statistics course is now in its second year and is proving to be very popular with a fast growing number of candidates entering at both the Foundation and the Higher level. The work submitted has often been of good quality and students of all abilities seem to have found the exam accessible. It has been particularly pleasing to find that candidates are making great efforts to interpret their data and diagrams. The skill of interpreting data is one that is valuable in adult life and it is encouraging to see that it is being developed in this age group.

As with all exams in their first years there are a number of helpful comments made by teachers entering candidates. We do listen to everything you say and act upon your suggestions where it is appropriate and possible. It has been suggested that it would be sensible if we tried to use real life situations in our examination paper questions and in the future we will try to source data that more accurately models the real world. Some teachers have suggested that at all levels, but particularly at the higher level, students have spare time when they have finished working through the paper. This is something that is always likely to happen to a few candidates at all levels of ability but we hope to give such students more opportunity to expand on their interpretation and inferences by sometimes asking them to 'discuss' the statistical implications of their calculations and diagrams. This means that they can write more down if they so wish.

The coursework aspect of all GCSE course presents challenges for teachers, particularly when the subject is new. We have tried to give some clear guidelines in the coursework pack, which we hope that you find helpful. Teachers can get much additional help by attending a local support course. Failing that the Statistics team are always willing to give advice - contact Edexcel with your query. The coursework submitted this year showed that many centres had learned from the mistakes made in the first year of entry and marking was done more accurately. With time things will of course get easier.

The same piece of coursework can be submitted for both the GCSE Mathematics Data handling project and the GCSE Statistics, though it must be separately assessed for each course and a separate candidate record sheet completed and signed for each piece of work. It may happen that the same piece of work is called for in the sample for both Mathematics and Statistics. In this case, if your entry is much larger than the size of the sample, you may be able to substitute another candidate's work at an equivalent level, preferably at the same mark, for either Mathematics or Statistics. If you do so you must include a letter to the moderator explaining why you have changed some of the sample. However, if your centre is small you will not be able to substitute,

nor if you make entries for either Mathematics or Statistics with another Awarding Body: then you will have to photocopy the work. In this case please add a note to the moderator explaining the reason, and so that the moderator understands that work in colour will not show up. There is no need to photocopy work just in case an additional sample is requested by Edexcel: in this case we will make alternate arrangements. For further advice please contact our coursework team by email: the address is coursework@edexcel.org.uk

7. GCE Mathematics

Further Mathematics

In the new specification, candidates must have obtained an A level in Mathematics prior to (or at the same time as) claiming any awards in Further Mathematics. In addition, if the A level Mathematics award was not obtained through Edexcel, then the centre needs to provide evidence of the A level Mathematics award and the units used in achieving it, using the Joint Council's Transfer of Credit form. The completed form should be submitted to the Special Requirements section at Edexcel, One90 High Holborn, London WC1V 7BH

Renumbering of GCE Mathematics Units

In order to minimise confusion and the potential for a mis-match between unit and cash-in entry codes, the Further Pure Mathematics units and the Statistics 3 unit in the new GCE Mathematics specification have been renumbered.

The following numbers should be used when submitting entries for these units.

Unit	Published unit code	New unit code
Further Pure Mathematics 1	6667	6674
Further Pure Mathematics 2	6668	6675
Further Pure Mathematics 3	6669	6676
Statistics 3	6670	6691

Examinations Officers were notified in January 2005 and GCE base data has been amended accordingly.

Legacy Specifications

The legacy specification has been withdrawn. There is a final opportunity to cash-in the qualification in January 2006.

8. Entry Level Certificate

A reminder that Edexcel offer the Entry Level Certificate award at National Curriculum levels 1, 2 and 3. The certificate can be taken as a pre-GCSE course giving the candidates the confidence to progress to GCSE during KS4. To be eligible for an award candidates need to pass one stage test and complete one coursework task. The Teachers Information Pack contains the tests and tasks and can be requested from the Assessment Leader at hajra.maniar@edexcel.org.uk. The Specification and the Specimen Assessment Materials can be found on the Edexcel website.

9. Summer 2005 GCSE Mathematics

Report by the Chief Examiner, Graham Newman

1387 entries: 314543

1388 entries: 39865

Total entries: 354408

My thanks must first go to the many teachers of mathematics who have prepared the Summer 2005 cohort of candidates for their GCSE examinations. Examiners and moderators have reported a noticeable improvement in the performance of the candidates this summer, which has resulted in a slight increase in the grades awarded, justifiably. This is not as a result of the assessment instruments becoming easier: there is clear evidence from marking and moderating that the performance of the candidates has increased.

There will be some centres who do not experience an increase in performance; my comments are based on the whole marking and moderating exercise. But a significant number of centres are using the many reports that Edexcel issues to assist them in preparing candidates for our examinations. Equally many centres this year will use the detailed diagnostic information that we are able to provide for many candidates. This information is made available as a result of the papers being scanned and marked by Examiners on-screen, their marking processed electronically. This has resulted in greater accuracy of marking. Centres can also be reassured that GCSE Mathematics markers are either teachers or qualified workers undertaking their marking under regular supervision. We were able to find sufficient Examiners to undertake the marking of GCSE Mathematics papers this summer. However, we do anticipate an increase in the number of candidates for Summer 2006, so if any teachers are interested in joining our team of committed markers, please contact Edexcel immediately to register your interest. The benefits of marking the work of candidates can be enormous in terms of improving your own teaching, and the preparation of your own candidates for examination.

I must also thank all those teachers who acted as Examiners or Moderators this summer. The process of marking the work of so many candidates is enormous, and yet there are very few problems in such a complex process. The continued commitment of such a dedicated team assures all centres of accurate and efficient marking every year.

1. Entry Level Mathematics

Interest in our entry-level scheme is continuing. Foundation GCSE papers remain accessible to lower ability students, but the Entry Level scheme is also recognised as a useful route through to GCSE. Many centres are finding that work on the Entry Level scheme can provide useful preparation for possible GCSE entry, and the dual use of coursework for entry level and GCSE means that dual entry of candidates for both does not become onerous in terms of workload.

This scheme is teacher-dependent, and our thanks must go to the many teachers who have given time to ensure that the entry level scheme worked well in their schools. It is clear that some centres are finding the paperwork difficult to manage; the subject report from the Principal Examiner for this scheme includes some useful guidance to assist centres in this aspect of running the course.

Work undertaken by students was good. It is important that all candidates ensure that they are well practiced in the work at lower levels. It is sometimes perceived that candidates could simply be entered at the higher of the three levels, yet many candidates do benefit from working through all three of the levels, in order to experience assessment of the work at the lower levels.

If GCSE coursework tasks are used for the entry level course as well as for a dual GCSE entry, then centres would do well to make an additional copy of the evidence, since the GCSE moderator may also call for the coursework as part of the GCSE sample.

Given the success of this scheme, I would like to encourage all centres to consider this scheme for their weakest candidates, particularly if they feel that such candidates may not be successful at GCSE. Equally entry-level assessment can be taken at a time convenient to a centre, so this is perhaps more appropriate for candidates whose attendance is not reliable.

2. Coursework.

2.1 Coursework administration

As in previous years the entry was split into those centres who chose to enter candidates for the Board Marked option (7B) and those who chose to follow the traditional route of submitting teacher assessed coursework for moderation (7A).

In general centres administering this scheme did so efficiently and accurately. Deadlines for the submission of work are sent out early in the year, and all centres are asked to ensure the work is sent in before this deadline. Many centres are still failing to use the correct Candidate Record Form: the correct form includes spaces for both a teacher and a candidate signature. Failure to use the correct form in the future will cause inconvenience to centres, and will delay processing of coursework marks. Contact Edexcel if you are unsure as to which form should be used, or download a copy from the Edexcel web site.

Work should be sent in a convenient way for marking or moderation. Securing the pages using treasury tags is most appropriate, but other methods of securing the work are also used. Work should not be sent in bulky ring- or hardbacked-files. Nor should the work be sent loose-leaf. The work from the whole centre should be arranged in the same order as on the OPTEMs.

For centres using Option A (teacher assessed coursework) it is worth noting that there was clear evidence this year that centre-based administration was far less accurate than in previous years. This includes errors in transferring marks to OPTEMs, and in totalling marks on candidate record forms. If the work of a candidate is missing or unobtainable then "X" rather than "0" should be inserted on the OPTEMs form. If a piece of work is lost then "X" should also be used; a mark can still be accepted under some circumstances, but this should be accomplished by submission of the appropriate Special Consideration forms through the Examinations Officer. Centres need to be aware of the importance of getting this part of the process correct: failure to do so could result in the *adjustment of marks of all candidates in the centre*. Annotation of coursework by the teacher will ensure the moderator will find it easier to understand how the school has arrived at a mark, and will also provide additional evidence to support the centre-based assessment. We are grateful to all centres who took the time to annotate the coursework. Internal assessment of the coursework is vital. This should be undertaken *before* marks are added to the OPTEMs form, since changes following internal standardisation could affect candidates other than those selected for the sample.

Most Option A centres used the approved AO1 tasks and assessment guidance provided by Edexcel. If tasks from other examination boards are used, centre-written tasks, or Edexcel tasks issued before Summer 2003, then these are not "approved", but can still be used, as long as copies of the task are provided when the work is sent, and general assessment criteria (using the AO1 emulation document) are used in assessing the work. Option A centres benefited this year from a more detailed coursework report from the moderator, which gives detailed feedback to the centre on their assessment of the work. Where there were problems, these were listed, and useful guidance provided which should enable centres to improve the work of candidates in future sessions. The majority of centres are commended on their accurate assessment of the coursework. Unfortunately there were more centres this year who submitted work that had been marked inaccurately: in the worst cases incorrect work was marked as correct and credited with marks inappropriately, which therefore required adjustment across the whole centre. The onus is upon the teacher to take account of incorrect work when allocating marks to the coursework.

For centres using Option B a few centres still submitted tasks that were not the defined tasks for this option. In these cases centres had to amend their entries to Option A and mark the work themselves. Centres using this Option B need to be aware that since the work is marked by Examiners, rather than by teachers at the centre, it has no tolerance in terms of marking, unlike option A, which has a tolerance of ± 3 marks out of 48. The standard of work submitted for Option B showed little difference to that submitted under option A.

The following sections provide an overview of comments relating to AO1 and AO4 tasks. You are advised to consult the report of the Principal Moderator for specific task-related comments: these are useful, in that they provide detailed information which you can use to raise the performance of the candidates undertaking a specific task in your centre.

2.2 AO1 tasks: Using and Applying Mathematics

Much of the work submitted was of a good quality, building on the experience of teachers' assessment of previous coursework in centres. Guidance given to candidates should be constructive, but not prescriptive: see the additional guidance notes for teachers on this point. It becomes a real concern when most of the work submitted by candidates from a particular centre follows almost identical processes of investigation. It is the responsibility of the teacher to ensure that the work submitted is of the candidate alone, and not copied from either another candidate or source (such as the internet). Unfortunately I have to report that this year there was a significant increase in the number of cases where candidates were penalised because there was irrefutable evidence that they had copied their work from another source. We retain reference copies of many coursework items available on the internet, and candidates will be penalised if copies of these are merely downloaded and sent in place of genuine work for a candidate.

Candidates benefit from giving clear explanations for their choice of processes at each stage of their coursework presentation. In investigating numbers that result in series, use of clear tables assists in terms of presentation.

In deriving and using generalisations all variables must be defined. It is easy to check that all letters have a clear definition before submittance of the coursework. It is not sufficient to merely state a generalisation: the process by which it has been arrived at should be clear. For example, "add 3 each time" is insufficient: what is needed is a clear statement that this results in " $3n$ " in the formula. Equally any numerical term should be explained in the context of the investigation.

Many candidates are using differencing techniques to arrive at generalisations. Again, working associated with these methods should be always be shown, and the link between the differencing method and the resulting formula explained. To gain the higher marks candidates should also link the generalisation back to the context of the problem, explaining how the coefficient of the variable and the number term change in accordance with changes in the context. Marks at the highest level also depend on the candidate describing exceptions to the rule, and ensuring that investigations are exhaustive, which can be done using algebraic methods.

More able candidates can sometimes choose to ignore the earlier stages of an investigation, starting by merely stating a set of formulae and investigating their significance. But this could be their downfall! The earliest stages of an investigation provides opportunities for candidates to define the outline of the investigation clearly, showing how the formulae are built up. Equally it is important that candidates show they can employ alternative methods of investigation (see strand 1), and an earlier (sometimes simpler) method used by an able candidate will then be an alternative to a more complex algebraic approach used later.

Work presented needs to be organised systematically to show progression through a task. Each stage requires a summative explanation, and some reasoning as to why and how the investigation can be moved forward.

2.3 AO4 tasks: Handling Data Project

Many projects submitted this year were far better focussed. Few were excessive in the number of pages submitted, and many were concisely written. The work submitted this year showed an improvement in the candidate's ability to interpret their results, but this remains an area of weakness in many pieces of work. Advice from centres probably contributed to this improvement. Unfortunately it is clear from the evidence of the work presented that sometimes the guidance given by centres is too structured, leading to projects which are too similar. Candidates are sometimes too eager to follow advice given, and it could be the case that more able candidates are now being limited by the advice given, leading to far fewer "creative" projects being submitted, and a general reduction in the number of projects which could earn the highest marks. This does not seem to prohibit centres awarding the highest marks to projects which are not creative and well thought out, resulting in far more AO4 projects being too generously marked than AO1 tasks.

If all candidates submit similar projects, then none may necessarily be creative: to gain the highest marks they should show flair, understanding of statistical techniques, and some differences compared to other projects submitted.

GCSE Statistics has attracted a much greater entry this year, with many candidates using the GCSE maths Handling Data project for their GCSE Statistics coursework. This raises some issues that centres need to be aware of. (a) If a single piece is requested for both GCSE Statistics and GCSE

Mathematics please follow the advice in section 6 on Statistics. (b) The coursework should be marked twice, using the separate criteria for these two specifications: do not assume that the rank order for Maths Handling Data projects will be the same for GCSE Statistics. It is sound advice to mark it for Maths first, then for Statistics, applying the two criteria separately.

It remains the case that in a significant number of centres the assessment criteria for the Handling Data project is misunderstood, resulting in work being generously marked. Frequent omissions or errors in projects include the lack of a plan, insufficient description and/or justification for the sampling method used, a failure to justify why a particular statistical method has been used, no evaluation of this strategy, and a failure to link their results and conclusion back to the original hypothesis.

In many projects candidates take a set of data, and apply many different statistical techniques to analyse it, arriving at several similar statistical results, all of which are not necessary for the investigation. This redundancy should be penalised. Instead the candidate should be making a choice as to which is the most appropriate technique to use, justifying this choice through reasoning, and then applying it to the data... then moving on perhaps to a different set of comparisons within the context of the investigation.

Many candidates are also submitting a number of projects rather than a single project. For example, candidates sometimes use a sample of data for a number of different analyses, but these analyses are not linked in any way. This is therefore essentially a number of different projects. Such a submittance will fail to earn the same marks as one which is coherently a single project, in which a number of analyses are linked, both in terms of the project outline at the beginning, and the evaluation and conclusion at the end.

Higher level techniques will not automatically earn higher marks. Techniques such as standard deviation, stratified sampling, BMI analyses can only attract higher credit within a project in which they are appropriate techniques to use, well justified, and in a project that, by its overall structure and approach, is creative.

There have been many examples of incorrect or unjustified work or presentation which have been taken as correct by the teacher, and not penalised. Commonly this was obvious in cumulative frequency points plotted at mid-interval points, incorrect calculations of means from grouped frequency tables, and standard deviation without supporting evidence of methods of calculation (sometimes wrong). If there are a significant number of cases in work submitted to moderators, then the difference between the moderator and the centre may result in all the marks being reduced for that centre.

3. Written Papers

Performance on the written papers was, overall, better than in previous years, with candidates demonstrating more clearly what they could do, and what they had learned. There were far fewer cases where papers were left incomplete: the general evidence was that candidates appeared to be far better prepared for the examination papers, and felt more able to have a go at every question, in some way. Whilst presentation of working out remains an issue for many candidates, it was noted that this year far more candidates than previously were presenting their working out for consideration, and will have benefited in terms of marks.

There were some areas in which candidates have made a significant improvement since last year. In those geometrical questions in which candidates were asked for reasons in justification for arriving at an answer, there were far more examples of candidates quoting geometrical facts, theorems and reasoning, rather than merely giving the necessary calculation. This is indeed what is needed to earn the credit in these cases, but it also shows that candidates had a better understanding of geometrical properties, and were confident in demonstrating this. There was also an increase in the number of cases where candidates were able to successfully manipulate algebra, particularly at Intermediate level. This is an important aspect, particularly for those on the grade C borderline. It will also be reassuring to employers that candidates did slightly better on those questions that tested non-calculator mathematics, particularly long multiplication and estimation, and also on fraction work, which is probably the result of much work being undertaken in centres.

There were some aspects which candidates were less successful this summer. Pie charts were done less well, and there was a decline in some number work.

There are a number of problems that remain significant for candidates, and will result in them losing marks. Far too many candidates continue to work in pencil, or in strange colours of ink. Not only is this frequently illegible, but there is clear evidence that candidates who work in pencil are far more likely to rub out their working out which could lose them valuable marks. Equally candidates should give some thought to the presentation of graphs on grids. Whilst we have assisted candidates in presenting grids that are "greyed" rather than black, candidates should ensure that lines drawn on the grid are still clear in terms of contrast against the grid: a sharp pencil is sometimes not the best option!

Candidates also need some clear instruction from centres with regard to *where* they place their work. Sometimes examiners find working out in spaces at the bottom of pages, on blank pages at the back, even on front covers, frequently without any direction from the candidate as to which question it relates to! The advice that centres should emphasise to all candidates is that they should confine themselves to the working out space provided for that question. If this proves to be insufficient there is only ONE course of action they should take: they should ask for an extra piece of paper which they should attach with a treasury tag to the back of the examination paper, and should continue their answer there, clearly indicating the question they are continuing. I would ask that centres emphasise this in preparing candidates in the future, particularly during mock examinations.

There remains the old issue of equipment. There is little evidence of candidates attempting the calculator paper without a calculator, but far more evidence of candidates not having compasses or protractors with them, an expensive folly in terms of marks. The other issue is with respect to the use of tracing paper. It is advisable for all candidates to have tracing paper for attempting transformation questions. However, the tracing paper used is not considered as evidence by the Examiner; it should therefore not be submitted with the examination paper in the future.

On the calculator papers we continue to see inappropriate methods. For example, on a calculator paper the calculation of VAT should be done in a single step; it is inappropriate to use a "build up" method (eg 10%, 5%, 2.5%), and in most cases candidates using this method get it wrong. Equally a calculator can be used as a valuable aid to check answers; candidates should not assume they can always get it right! $0.2 \times 0.2 = 0.4$ is inexcusable if a calculator is available. Centres should concentrate on giving candidates advice and practice at using their calculator, particularly in answering questions on percentages and standard form.

On calculator and non-calculator papers candidates are struggling with questions in which negative numbers arise. They seem quite happy to handle negative numbers in abstract situations, but when they arise as part of a problem, for example in algebraic manipulation, they become very confused.

In solving equations many text books take the easy solution of providing questions which always arrive at an integer answer. Sadly this is not the case in real life! Candidates appear to need further practice in handling fractional or negative solutions. In particular even higher level candidates misjudge final steps in their solution: $4x=5$ frequently becoming 0.8 instead of 1.25

For Higher level candidates the main weaknesses were the rearrangement of formulae where the intended subject appears more than once, 3D trigonometry, transformations on graphs, and bounds.

4. Trial Papers

I cannot conclude this report without some mention of the trial that Edexcel contributed to this summer. Earlier this year QCA commissioned a trial of some 2-tier papers. Essentially the format was as follows:

Foundation Tier: grades C, D, E, F, G

Higher Tier: grades A*, A, B, C, D

There was a non-calculator and a calculator paper at each tier.

Candidates volunteered to take these papers, which were taken in addition to the normal GCSE Mathematics papers. A small but representative sample of about 6000 candidates took part.

Not only did they have a greater range of grades associated with each paper, but each paper also had a greater weighting of marks at the lower end of that paper, requiring candidates to demonstrate greater proficiency in terms of those earlier questions than might normally be the case.

I would like to take this opportunity to thank all those centres who assisted us in the trial, which did involve them spending additional time preparing their candidate for these additional papers, which had a more extensive content than would normally be expected. My apologies that many more centres that did contact us could not be included in the trial; the number of candidates involved was restricted on this occasion.

There were a number of issues which participating centres had to take into account. Traditional Foundation candidates could achieve grade C, but then had to be taught the grade C material in addition to that normally required up to grade D. Equally it could not be assumed that Higher Level candidates could necessarily gain marks easily on grade D type questions; indeed, there were some aspects of the specification that were completely new to them at this grade level!

Having taken these papers the work of the candidates was marked by Examiners in the normal way, and the work was submitted to an awarding meeting. There is much analysis yet to do. We will be comparing the performance of the candidates between the trial papers and the normal papers, and making comparisons of a statistical nature. QCA are undertaking their own evaluation of the trial. We hope to publish a summary of the analysis later this year.

We have been provided with some early feedback from centres and candidates. The majority of those taking part in the trial have stated that they preferred these papers to the traditional 3-tier papers. Whilst they appreciated that they had to earn more marks on the easier questions, they found the papers motivating, and they were more confident of their abilities by the end of the examination: it was a more positive experience for them. This must be more important in terms of preparing students for post-16 mathematics. The papers, at 2 hours each, were considered to be too long in terms of duration; in hindsight a shorter time duration would have been more appropriate.

5. The future.

QCA will now deliberate the results of the trial. It is too early to consider whether or not there will be further trials at this time.

Many of you are now aware that in Summer 2008 there will be a significant change in the GCSE Mathematics specification, with the move by QCA from a 3-tier to a 2-tier structure. At Edexcel we have already started work on new specifications. Coursework will stay as it is. The two options will be a linear and a modular option, as now. The structure of the examinations has yet to be decided by QCA.

The significant change is in the way the modular examination will work. We have listened to many comments from centres over the past few years, and have redesigned the modular specification in answer to these comments from centres. In the new specification there will be many more occasions on which modular tests can be taken. There will be a modular test which closely matches the required content for the AO1 task, and a second modular test that closely matches the required content for the Handling Data task. The third modular test (taken at the end of the course) will only then examine that part of the content not assigned to the first two modular tests. This is a major change to our modular specification. If you are an existing centre using the modular course, or a centre which may consider this structure advantageous, then this new specification is a "must see"!

Unfortunately we have to await the QCA decision on the final structure of written papers before we publish the new specifications. We are currently expecting these to be sent out to schools in the Spring Term.

6. Conclusion

We continued to be pleased that our relationship with many of our centres is a strong one. If you have concerns, please continue to contact Edexcel directly with your concerns. Whilst we may not always be able to assist in all matters, we can offer advice, and note is taken of any comments received.

We are approaching a time of great change in Mathematics assessment. We will always strive to keep centres informed with developments, that they might have time to effect these changes in their classrooms. At a time when we are seeing the candidates performing better in their examinations, the relationship between Edexcel and teachers in schools must continue to be productive, that this increase in performance can be sustained.