**Chief Examiner Report - 1MA01 - June 2012**

**Linear Specification**

The new linear specification papers appear to have been well received both by centres and by candidates. Performance on the papers was encouraging; it was evident that many candidates had been well prepared for the questions that assessed problem solving and communication in mathematics.

Candidates were frequently able to demonstrate appropriate strategies for solving problems and were particularly successful in dealing with problems involving money both on foundation and higher tiers. There were, however, other candidates who failed to show full working to support their answers. Candidates must take note when questions are labelled with an asterisk to indicate that quality of written communication is being assessed. They should always make sure that full working is shown to support their final answer and present this working in a logical manner. When a decision has to made as the final answer then this decision should be given clearly in a written statement.  When geometric reasoning is involved candidates must use the correct terminology.

The majority of candidates do work in pen but some still work in pencil or unsuitable colours of ink such as red. Not only does such writing not scan well but, in the case of pencil workings, candidates often rub out workings which could gain valuable marks. There are some cases where very soft pencils are used for graph work which is then difficult to differentiate from the grid lines; an HB pencil is recommended for examinations.

There was evidence of some candidates not having the proper equipment such as a ruler, protractor and compasses. Likewise, some candidates were handicapped by the lack of a calculator.

Illegible writing was a problem in some responses, particularly on the foundation tier, digits were sometimes difficult to read or were written over. If an answer is changed then this should be crossed out and rewritten, the new answer should not be written over the previous answer. If it is not clear whether, for example, the answer is a '2' or a '5' then the mark cannot be given. There was also evidence of candidates mis-reading their own digits. For example, reading a '0' as a '6' and using the wrong digit in a subsequent calculation. Decimal points must also be clear, writing a number in standard form as an ordinary number, often leads to a number of dots with the position of the decimal point being unclear.

**Number**
On all papers, the quality of arithmetic gave cause for concern. Errors ranged from carelessness with basic arithmetic, particularly with subtraction and division, through to being unable to carry out long multiplication.

Calculation of percentages caused problems on both the calculator and non-calculator papers. The preferred method of calculating a percentage, even on the calculator paper, seems to be to use a build up method. However, in this case it is vital that the

initial percentage, usually 10% or 1%, is given correctly or the correct method for finding this is shown.

Calculations using negative numbers on the foundation tier were not well done. Candidates are expected to know the square root of the first ten square numbers. They are also expected to be able to know square and cube numbers. On the foundation paper, finding a fraction of a quantity proved to be a weakness. The more routine type of ratio question was reasonably well tackled but not all were able to apply their skills to problems involving ratio.

Many of the 'functional elements' questions required candidates to be able to interpret the question and then use their numerical ability. Candidates are not expected to have any specialist knowledge in order to answer these, all necessary information will be provided in the question. However, it is important that candidates are given the opportunity to practice these types of skills in the classroom. It was very evident on, for example,  a 'best-buy' question that many candidates had not previously had any exposure to this type of question.

On the higher calculator paper the problem of premature approximation caused some candidates to lose the final accuracy mark. Multi-step calculations are likely to occur in problem-solving questions particularly on the higher tier calculator paper. In such questions, accuracy should be retained throughout the solution with candidates making use of their calculator's memory or using the 'ANS' button to reuse previous answers in full rather than a rounded version. In such questions, a range of values is accepted for the solution, as shown in the published mark schemes, but there were many answers seen outside the acceptable ranges this time round.

**Algebra**
Algebraic manipulation was shown to be a weakness. On the foundation tier, simplifying very simple expressions was beyond many candidates. At the top end of this tier and at the lower end of the higher tier, there were problems with keeping the signs with the correct variables when simplifying longer expressions and with expanding brackets or factorising linear expressions. On the higher tier, a frequent error was to partially factorise a complex expression and to make errors expanding two brackets.

At the top end of the paper, algebraic manipulation still poses problems for the more able candidate when simplifying or adding algebraic fractions.

Much use of trial and improvement rather than algebraic process was seen in the solution of all types of equations. The formula to solve quadratic equations is generally not used well.

When attempting to draw a straight line graph, candidates on both tiers were hindered by their inability to work out the $y$ coordinate successfully following a substitution of $x = -1$.

**Geometry**
Candidates are expected to use technical language both when describing transformations and when giving reasons in geometrical questions. Whilst correct

terms were frequently used in describing transformations, reasons given in geometrical questions were often incomplete or too vague. It is not appropriate for candidates to just give a list of geometrical reasons; the reasons given must be appropriate to the method used.

Problem solving questions that required candidates, on the higher tier paper, to employ multi-step methods to find missing lengths or angles were not well done. Candidates often had difficulty in realising that an initial calculation would be necessary before the required length or angle could be found. In is critical that in this type of problem solving question, all working is shown and accuracy is maintained throughout the question with any rounding only taking place once the final answer has been found.

When working with area, arithmetic again caused problems with many candidates being unable to work out $3.6 \times 3$ or $0.6 \times 0.6$ correctly.

### Measure
Questions on the foundation paper involving time were not well done. A simple timetable was frequently misread or times were given that were not in the timetable. It was also common to see candidates subtracting times as if they were base 10 numbers.

Candidates are expected to know and be able to use metric/imperial conversions.

The absence of a ruler and protractor hindered some candidates and there was clear evidence of protractors being used incorrectly both for measuring angles in a diagram and for measuring bearings. Bearing were frequently measured anti-clockwise rather than clockwise.

### Statistics
Graph work was generally well done with candidates on the foundation tier coping well with the instruction to 'draw a suitable chart or diagram'. However, axes should be labelled; too often the $y$-axis was not. Stem and leaf diagrams are well understood. More able candidates were able to draw correct histograms although even at this end, basic arithmetic errors resulted in incorrect histograms.

Statistical calculations were generally well done although finding the mean from a frequency table is still not well understood. There was the usual confusion between the terms median and mode.

When asked to compare distributions, candidates often resorted to explaining the result, in this case, of the fertiliser on the tomatoes rather than comparing a measure of spread and a measure of average. In such questions, a comparison but be given, just stating figures without a comparison is insufficient.

### Probability
Marking probabilities on a probability scale was done very successfully at 0 and 1 but with far less success when the probability was, for example, $\frac{1}{4}$. Arithmetic errors were common when adding up a list of probabilities in decimal form and then

subtracting from 1. Similarly, incorrect multiplication of decimals caused marks to be lost when using a tree diagram. Completing tree diagrams is well done by candidates at all levels but using them still brings about confusion when to add and when to multiply. Unstructured probability questions at the end of the higher tier paper are less well done; candidates continue to use replacement inappropriately.

**Julie Bolter**
**Chief Examiner**
**Linear GCSE Mathematics**
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