AQA

AS
MATHEMATICS

MD01 Decision 1
Report on the Examination

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General

The vast majority of students were well prepared in the routine use of the algorithms which constitute much of this syllabus. As a consequence, comparatively few scripts earned less than half marks. To gain the higher grades it was necessary to solve problems, describe them and their solutions clearly and perform basic algebraic techniques accurately

Last year it was possible to write that the general standard of presentation had been quite good with a significant minority being excellent. This year the excellent minority was still in evidence but the general standard was much lower. This was exemplified by untidy handwriting often verging on, even achieving, illegibility. Additionally, too many scripts had no sense of organisation with responses to a question appearing in a haphazard manner.

Decision Mathematics is a subject which demands not only mathematical precision but also clarity in the presentation of results. Too casual an approach to the latter can lead to students unnecessarily losing marks. In particular, students are well advised to cross out and replace incorrect work rather than trying to overwrite their first attempt. Working and answers should be carefully considered as to whether it is clear what these actually represent.

As in previous years, it was disappointing to note how high a proportion of the entry, when asked to present a clear, logical answer or description, proved incapable of providing a satisfactory response. Too many of these answers were simply illiterate. This examination tests mathematics not use of language but to earn marks an answer must at least be intelligible.

Question 1

This was almost always well answered. Mark loss in part (a) was virtually non-existent.
In part (b) it was pleasing to note that idiosyncratic methods of recording alternating paths were much fewer and that the length of the path caused no problems. Very few marks were lost by a failure to list the final matching.

Question 2

This was another question where maximum marks were common. In part (a), a few bubble sorts did appear and students had differing styles of noting where passes started or finished. However, examiners were able easily to judge what was happening and most answers clearly exhibited the requisite four passes.
Part (b) was a little more testing. Roughly one mark was lost on average, with the wrong answers usually selected from 10, 5 and 55 respectively for the three parts.

Question 3

Part (a) was almost always correct.
Part (b) was the first really testing question. In part (i) examiners looked for a response that stated that if x were equal to 7 then the edge *BC* would have been chosen instead of the edge CD. As the selection of CD after BC would not be a correct application of the algorithm, reasons invoking the creation of a loop were unacceptable and nor was the assertion that x must be greater than 10.
In part (ii), the incorrect $x > 10$ was seen more frequently than the correct $x \geq 10$. As was evident in Question 8, many students do not seem to appreciate the difference between $>$ and $\geq$.

Question 4

In part (a) almost all students were able to apply the Chinese Postman algorithm correctly, including the requirement to evaluate three totals. The correct 4 vertices were nearly universally identified. In this process it was noticeable that some students lost some time in painstakingly constructing a table to show the order of all vertices. It was simpler just to state them. The few compound distances caused no problems and the response to part (iii) was much improved on that of previous years.
Parts (b) and (c) were the next places where weaker students fell by the wayside – they either did not attempt an answer or produced apparently random numbers and letters. The rest appeared well-drilled in the requirements. Most favoured adding 10 to 167 rather than subtracting 12 from 189 in (b) and correspondingly in (c). Very few offered “start at F and finish at H” rather than the correct “start at either F or H”.

Question 5

This was another story of ‘two halves’. In (a)(i) a routine application of Dijkstra’s algorithm was very high scoring with many students scoring full marks. Three values at C were very rare and the omission of required crossings out only a little more frequent. Part (ii) was less well answered. The commonest wrong answers were to give the minimum time instead of the route or to terminate the route at J instead of G. These errors should serve as reminders to always read a question carefully and not to assume that routes always finish on the right of a diagram!
Part (b) was not answered quite so well. Able students had little difficulty but accurate use of inequalities with the correct numbers was a problem for others whilst the weakest had problems with both. A significant minority appeared to work out the required answer intuitively and then construct inequalities to fit.

Question 6

The first three parts of this question were answered quite well, the second better than the other two. One needless cause of mark loss was to draw several diagrams in the search for the correct answers to parts (b) and (c) and then fail to make clear which was intended as the final answer.
Part (d) was poorly answered although it did serve to differentiate clearly between students. A significant minority thought the answer lay in whether and how many of the vertices had odd or even degree. The majority were on the right track but only a small number could explain clearly, with reasons, why no vertex of degree one was possible. Many offered no reason at all and others answers were incoherent to the point of meaninglessness.

Question 7

This question, the longest, was only answered well by a few but all were successful in at least one part. The routines required appeared to be generally well-known but failure to read and understand the precise requirements of questions, omission of detail essential to demonstrate correct algorithm use and inability to express oneself clearly and correctly in words led to the loss of many marks.
(a) This was the best answered part with very few students ignoring the instruction to work on the given diagram. The loss of marks usually arose from the confusion between vertices and edges. Too many students offered an ordered list of edges instead of the required vertices. Otherwise this use of Prim’s algorithm was well known.
(b) (i) The majority obtained the correct value for the lower bound but the usual failure to clearly state the edges involved caused the usual loss of marks. Many students mistook the observation that they might use the given diagram for working as an instruction to do so and repeated their work for the previous part – some obtaining a different tree.

(b) (ii) The success rate moved back up again here. Most students made use of the given tables and then stated the tour they had found. The statement itself was not required but in many cases was fortunate as in the diagram no indication of where the tour started was indicated. Otherwise the method was well known and marks lost only by arithmetic slips.
(b) (iii) Most students with answers from the previous part understood what was needed here except for the clear request to find a *tour*. Many simply gave the length.

Question 8

This was a less lengthy and demanding question of its type than usual. All students achieved at least some success with only the very best getting near maximum marks.
(a) Was usually correct and fully explained.
(b) Wasn't so well answered. Most obtained $x + y \leq 32$ but for the second inequality the correct $x \geq 2y$ was greatly outnumbered by various incorrect combinations of x, $2x$, y, $2y$, $\geq$ and $\leq$. It was noticeable that the version served up here often bore little relation to the line actually drawn in the next part.
(c) Graphs were generally well-drawn with very few failing to use the scales accurately. Unfortunately, regardless of the answer given in the previous part, the line $y = 2x$ was in evidence at least as often as the line $x = 2y$. Objective line drawing was improved this year – few failed to produce one and a large majority had the correct gradient rather than the reciprocal.
(d) (i) Most understood how to proceed but many were hampered by an incorrect objective line. It was noticeable that the most successful used the line to identify the point they needed but then used simultaneous equations to identify accurately the required co-ordinates. Those who only read from the graph usually understood the practical need for integer answers but found the necessary accuracy difficult to achieve.
(d) (ii) This part was a deserved reward for those who had sustained method and accuracy to this point.

Mark Ranges and Award of Grades

Grade boundaries and cumulative percentage grades are available on the Results Statistics page of the AQA Website.

Converting Marks into UMS marks

Convert raw marks into Uniform Mark Scale (UMS) marks by using the link below.

UMS conversion calculator