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MATHEMATICAL OLYMPIAD FOR GIRLS 2020

Teachers are encouraged to distribute copies of this report to candidates.

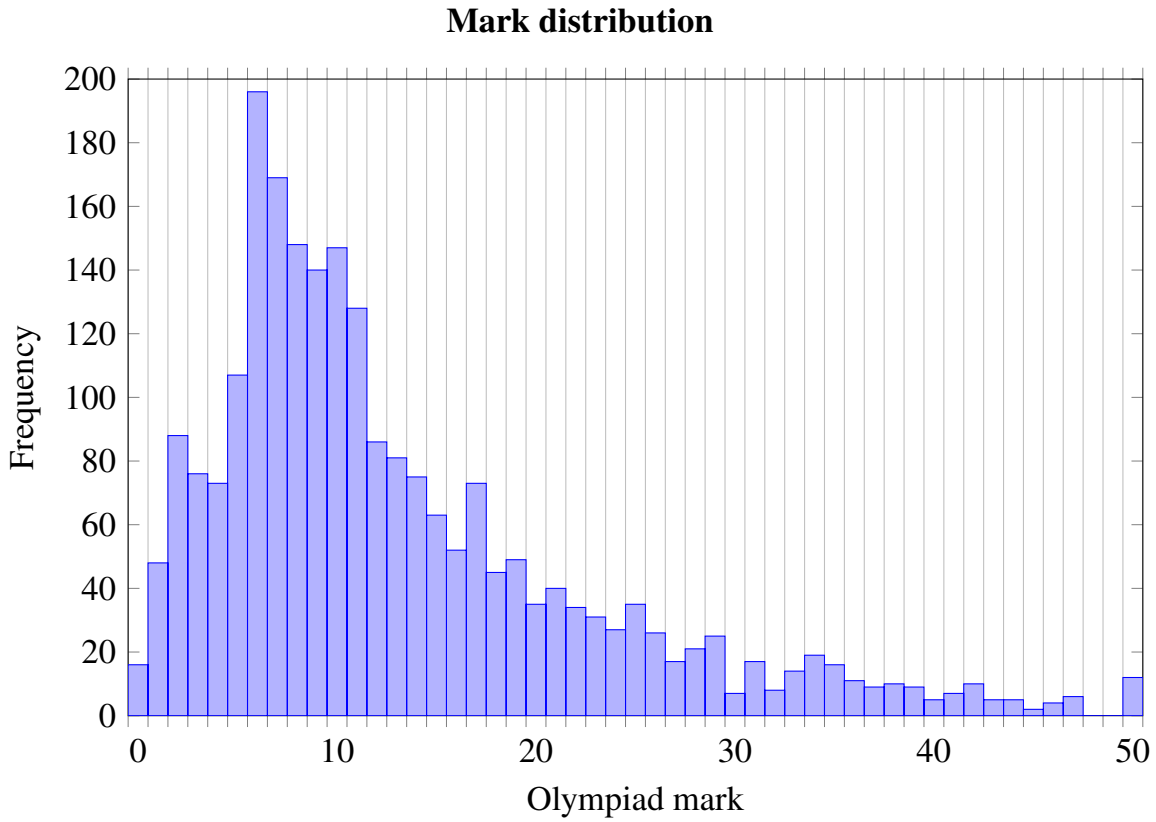
Markers' report

General comments

The 2020 MOG paper had a different format from the usual; due to the difficulties in collecting and marking full written scripts, all questions were answer-only. We are very pleased that, despite the challenging circumstances faced by schools, so many students were able to engage in some mathematical problem solving: this paper was taken by a record 2327 candidates.

The style and standard of the questions were comparable to previous years, and interested candidates should still be encouraged to produce full written solutions. Example solutions and accompanying commentary have been sent to participating schools, and can also be found at https://bmos.ukmt.org.uk/home/ukmog.shtml.

Although we did not see candidates' full solutions, common incorrect answers indicate how much progress they made. Overall, candidates engaged really well with the paper. It was pleasing to see so many attempts at the later questions. Even where candidates were not able to complete a question, there were often correct answers to early parts.



The paper was taken by 2327 candidates. We are not awarding any prizes this year, but we hope that teachers and candidates will find this detailed scores breakdown useful.

In order to produce a better spread of scores, part-marks were awarded in some questions, where common incorrect answers suggest that a candidate has made some useful progress towards the solution. For example, in Question 1(c), the incorrect answers 2 and 6 scored part-marks.

Twelve candidates scored full marks, and 56 scored 40 or more out of 50. The marks for some common percentiles were:

top 5%	35
top 10%	27
top 25%	18

Comments on individual questions

Question 1

A large majority of candidates managed to find at least one possible grid. A small number produced grids that included the digit 7, which cannot be used because no other numbers contain a factor of 7 which is needed to make a square number. Many candidates realised that the rows can be swapped and gave an answer of 6 for the final part. Others found two essentially different grids, but forgot about swapping rows, giving an answer of 2. The correct answer of 12 was obtained by around 300 candidates.

Question 2

Geometry questions are usually found challenging, so it was good to see so many candidates engaging with it, and around 460 successfully solving it. In fact, almost half the candidates showed good engagement with the question by answering the first part correctly. There was a small number of common errors, such as giving the side of the square instead of the area.

Question 3

The technique introduced in this question is very common when solving Diophantine equations (these are equations where only integer solutions are required). Almost all candidates engaged with the problem and found at least some of the solutions to the first equation in part (b). A common mistake was to forget negative factors (for example, -9×-11). The second equation was considerably more difficult, requiring candidates to realise that only one of the many factor pairs gives integer solutions. Only around 90 candidates managed to find the solution.

Question 4

It was very pleasing to see a wide variety of candidates engaging with this question – around 200 solved it successfully, and for some candidates it was their only complete question. There were inevitably some numerical errors, but around a quarter of the candidates showed a good understanding of the second game.

Question 5

This was a very demanding question which required careful thinking and attention to detail. Only 66 candidates solved it fully, although a further 200 demonstrated very good progress. It was good to see that around half the candidates engaged with it to some extent. As is often the case with sequences questions, trying some small cases can lead to very useful insights.

