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Examiners' report

MATHEMATICS B (MEI)

H640

For first teaching in 2017

H640/03 Autumn 2020 series

Version 1

Introduction

Our examiners' reports are produced to offer constructive feedback on candidates' performance in the examinations. They provide useful guidance for future candidates.

	Reports for the Autumn 2020 series will provide a broad commentary about candidate performance, with the aim for them to be useful future teaching tools. As an exception for this series they will not contain any questions from the question paper nor examples of candidate answers.

The reports will include a general commentary on candidates' performance, identify technical aspects examined in the questions and highlight good performance and where performance could be improved. The reports will also explain aspects which caused difficulty and why the difficulties arose, whether through a lack of knowledge, poor examination technique, or any other identifiable and explainable reason.

A full copy of the question paper and the mark scheme can be downloaded from OCR.

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Paper 3 series overview

H640/03 is the final of the three compulsory components in the A Level assessment. It contributes 27.3% of the total A Level and assesses content from pure mathematics with the questions in section B set around a short comprehension passage.

Many candidates appeared well prepared for this paper and there were good solutions seen across both sections of the paper. Conversely there were candidates who did not appear confident and who struggled the questions on this paper. Given the disrupted year that this cohort of candidates have had, and the fact that there is a very small number of entries, it would be difficult to draw too many conclusions from the performance on this paper.

Candidates who did well on this paper generally did the following:	***Candidates who did less well on this paper generally did the following:***
• Showed clear, logical working out. • Appreciated when a conclusion was needed after some calculation or other working. • Dealt confidently with radians. • Showed resilience when dealing with longer procedures.	• Presented working in a haphazard way. • Struggled to follow through a chain of reasoning. • Had only piecemeal understanding of longer procedures. • Struggled to see how different question parts interrelated.

It was noticeable how many candidates used the additional working space in the answer booklet and/or additional answer books. Examiners were pleased that most candidates followed the instructions and labelled these questions clearly enabling all their marks to be credited appropriately.

Section overview

Section A was the pure maths section. The questions ranged from straightforward low mark questions like Question 1 that most candidates scored well on to longer 8 mark questions like Question 7(b) and Question 8(b) that required secure subject knowledge and the ability to maintain accuracy over an extended solution.

Section B was the Comprehension section and it seemed possibly more accessible that some others have been in the past.

Question 2

There was difficulty in dealing with the inequalities in Question 2, with some candidates losing marks by writing 'and' between their two inequalities.

Question 4

In Question 4 although most realised that BC was parallel to **i** + **j**, only the most able realised they had to consider the magnitude of that vector sum.

Question 5

In Question 5 many did not realise the need to use radians.

The command word used in part (d) is 'Determine' so, when considering whether the iteration converges to 'this root', the answer should say either 'Therefore it does converge to this root' or 'No, it actually converges to …'.

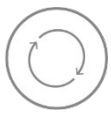
Question 6

Question 6(b) says 'Show that the straight line is consistent …' so an answer should make clear how any working has shown the consistency and conclude that 'This shows the straight line is consistent with this model'.

Question 7

Only the strongest candidates appreciated the connection between Question 7 parts (a) and (b) and many attempted, unnecessarily, a partial fraction decomposition with variable degrees of success.

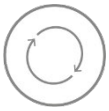
Not all candidates appreciated the need to give the number of fish in the lake as an integer.

	**AfL**	The front cover instructions state that candidates should 'Give your final answer to a degree of accuracy that is appropriate to the context'. This may will be 3 significant figures in most cases, but it is always good practice to check back with the question before stating the final numerical answer.

Question 8

As in Question 2, a significant number of candidates struggled to solve their quadratic inequality for Question 8(a)(ii).

In Question 8(b) many candidates just substituted for *x*. In Question 11 many did not realise that to show it is an increasing function they need to show that the gradient function is >0.

	**AfL**	When doing integration by substitution there are three aspects to consider: • Substitute for *x.* • Substitute for *dx* (by differentiating the substitution and rearranging). • Deal with the limits (either change them to limits of *u* or change the answer in *u* back into *x*).

Guidance on using this paper as a mock

Section A has a nice balance of short routine questions and part questions with a couple of more involved extended response questions (Question 7(b) and Question 8(b)) which would form a nice formative assessment activity. Question 4 (vectors) and Question 6 (logarithms) cover AS/stage 1 material with the remainder material that is only in the full A Level specification.

The comprehension passage does include the use of $\int \frac{1}{x} \mathrm{d}x$ so could not be used as part of an end of year 12 assessment if students had only covered the AS content. However once that standard integration has been covered then the passage and comprehension questions could make a nice first assessment of this aspect of H640.

	**OCR support**	Read the recent blog on the OCR website for more suggestions on 'Preparing for the comprehension section'.

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