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Examiners' report

MATHEMATICS B (MEI)

H630

For first teaching in 2017

H630/01 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.

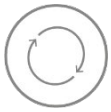
The reports will include a general commentary on candidates' performance, identify technical aspects examined in the questions and highlight good performance and where performance could be improved. The reports will also explain aspects which caused difficulty and why the difficulties arose, whether 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.

Paper 1 series overview

There was a small number of candidates who entered this autumn exam. The range of responses were average or poor with inaccurate arithmetic, weak algebraic skills and significant difficulties with vectors. In a larger entry we would expect to see candidates work more accurately, giving their answers in the correct form and completing problem solving questions.

Candidates who did well on this paper generally did the following:	*Candidates who did less well on this paper generally did the following:*
• Worked well with vectors • Handled negative powers accurately • Completed mathematical arguments • Linked topics, (e.g. Question 11c)	• Made errors with negative powers • Gave decimal answers for exact values • Wrongly applied the laws of logarithms • Had no diagram to help understand the question (e.g. Questions 3b and 12a)

	**AfL**	In Question 1, it is not enough to find a counter example. There must be a clear argument that the statement is false. Similarly, in Question 3, it is necessary to finish off the argument that the triangle is isosceles.

Useful approach to teaching using technology

Question 5 shows a method for explaining differentiation from first principles in a numerical rather than algebraic form, but it seemed unfamiliar to many candidates. The idea of a sequence of gradients that converge to a value which is the gradient of the tangent can be seen numerically. This can be a good way to introduce the topic with candidates exploring the gradients of different curves at different points.

Common misconceptions

Distance/displacement

In Question 6, candidates were asked to find the times at which the velocity was zero. This was intended to be a stepping-stone to finding the distance travelled over a time interval which included a change in direction of travel. Most candidates who were given marks here did so from the special case as they did not appreciate the significance of the value $t = 5$ from part (a).

Sketching a graph/sketching a gradient function

In Question 7 candidates were asked to sketch the gradient function of the given function but it was common for the sketch of the cubic graph to be seen. Those who had found the coordinates of the stationary points on the cubic graph still managed to score 3 out of 4 as these *x*-coordinates were also key features of the gradient function.

Using *suvat* equations when the acceleration is not constant

The *suvat* equations were seen used correctly by many candidates for vertical motion. However, they were also used inappropriately by some candidates in Question 6, where the acceleration is variable, and in Question 9. The equations for finding V and T were most easily obtained directly from the velocity-time graph, but could also be found using suvat equations for the acceleration and deceleration phases separately once the displacement was split into 80 m and 160 m. Candidates who applied suvat using $s = 240$ could not obtain the correct equations.

Key teaching and learning points – comments on improving performance

Solving simultaneous equations

Generally, simultaneous equations can be solved by calculator. It is good practice to show the equations in the form they need to be entered into the calculator as evidence of a method. In Question 8, there was a requirement for an algebraic solution for simultaneous equations as the given line had an unknown coefficient. In addition, as the question command word is 'determine', full justification of the answer is required.

Guidance on using this paper as a mock

Make sure candidates have revised vectors thoroughly, including Newton's second law in vector form.

Question 8 could be adapted to make it a little easier if a value were given instead of k in the equation of the given line.

Supporting you

Review of results

If any of your students' results are not as expected, you may wish to consider one of our review of results services. For full information about the options available visit the OCR website. If university places are at stake you may wish to consider priority service 2 reviews of marking which have an earlier deadline to ensure your reviews are processed in time for university applications.

Supporting you through 2020-2021

Our priority is supporting you and your students this autumn and to support you as you prepare for summer 2021 exams. We'll update our website information regularly with resources, guidance and key information.

Take a look at our support for:

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- Students
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