

**AS/A LEVEL GCE**

*Examiners' report*

# ***MATHEMATICS (MEI)***

**3895-3898, 7895-7898**

**4776/02 Summer 2018 series**

**Moderated component**

Version 1

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## Introduction

The coursework component of Numerical Methods 4776 aimed to enable candidates to demonstrate a facility with technology and an awareness of the difficulties that can arise when computers are used to do mathematics. Candidates were expected to investigate a problem which was suitable for numerical solution, using one of the methods in the specification. (Problems which have analytical solutions are acceptable only if the analytical solution is too time-consuming, or too advanced, to be feasible.) Candidates could use computer technology to develop a solution which was both efficient and accurate. In particular, they had to show how the desired accuracy had been achieved, either by means of sufficient iterations of the numerical process to ensure that the accuracy has been achieved, or by means of a theoretical analysis of errors.

OCR hopes that you and your candidates have enjoyed working through the coursework task. Although not part of the reformed A Level Further Mathematics assessment structure, you may find this task a useful teaching and learning activity if you are planning to deliver the optional Numerical Methods paper as part of H635/H645 OCR B (MEI) Further Mathematics.

## Resitting Numerical Methods

This was the final year of the unitised AS/A Level Further Maths qualification 3896/7896. There is a resit series in 2019 for those candidates that have certificated 3896/7896 in a previous year. Those candidates that wish to resit 4776 may choose to carry over their coursework mark and only sit the examination paper, or to undertake a new coursework task and sit the examination paper (it is not possible to only complete a new coursework task and carry over the previous examination mark).

The entry code 4776B should be used for those candidates that wish to carry over their coursework task.

The entry code 4776A should be used for those candidates that wish to complete a new coursework task. Please note that these candidates are not permitted simply to improve a previous, marked, piece of work; they must undertake a new coursework task.

## Administration

It was pleasing to note that moderators reported that most centres had administered the coursework efficiently, meaning that marks were submitted on time and the sample request dealt with speedily. This all made the process of external moderation very much easier.

In a very small number of instances, marks were not submitted until many days after the deadline set by OCR and the sample sent very late. This causes pressure on moderators who have less time to do their work. There were few clerical errors, and inconsistent marking resulting in an invalid order of merit occurred only in a handful of centres.

The major problem for moderators is caused when assessors tick work that has not been checked and in a number of cases credit was being given for incorrect work.

The marks of candidates in most centres were appropriate and acknowledgement is made of the amount of work that this involves to mark and internally moderate. The component specific comments are offered for the sake of centres who have had their marks adjusted for some reason. Centres should note that having marks adjusted does not imply inconsistent marking, merely that the level has been misjudged.

## Common issues

The most popular task is to find the value of an integral numerically.

Particular problems encountered were as follows.

### Domain 1

A formal statement of the problem is required that has been chosen by the candidate. Please note that the function to be used does not have to be very complicated, merely one that cannot be integrated directly by standard techniques available to the candidate. There are a number of cases each year when the function is entered incorrectly into the spreadsheet, often caused by the complicated function being used. The consequence is that the answer is not that of the problem stated. In most cases, this arises from an unnecessarily complicated function.

### Domain 2

A criterion in this domain is for candidates to say why they are using the techniques chosen. They are, however, usually good at saying what they are going to do.

### Domain 3

Finding numerical values for one of the methods up to at least 64 strips is a requirement for a substantial application.

### Domain 4

It is not enough to state what software is being used. A clear description of how the algorithm has been implemented is required, usually by presenting an annotated spreadsheet printout.

### Domain 5

It is accepted that candidates might use a function that they are unable to integrate (because of where they are in the course) but which is integrable. However, it is not then appropriate to state a value found by direct integration.

Many candidates will state the value to which the ratio of differences is converging without justification from their values. Other candidates use the “theoretical” value regardless of the values they are getting or even use these values without working the ratio of differences at all. These errors will lead to inaccurate or even incorrect answers; these should be noted by the assessor and penalised.

### Domain 6

Most of the marks in this domain are dependent on satisfactory work in the error analysis domain and so often, a rather generous assessment of that domain led to a rather generous assessment here as well. Teachers should note that comments justifying the accuracy of the solution are appropriate here, but comments on the limitations of Excel are not usually creditworthy.

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