

MEI Structured Mathematics

OCR Advanced GCE Unit 4753/02 Methods for Advanced Mathematics

Coursework Assessment Form

TASK: Candidates will investigate the solution of equations using the following three methods.

- (i) Systematic search for change of sign using one of the three methods: decimal search, bisection or linear interpolation.
- (ii) Fixed point iteration using the Newton-Raphson method.
- (iii) Fixed point iteration after rearranging the equation $f(x) = 0$ into the form $x = g(x)$.

Coursework Title		Date	
-------------------------	--	-------------	--

Candidate Name		Candidate Number				
-----------------------	--	-------------------------	--	--	--	--

Centre Name		Centre Number				
--------------------	--	----------------------	--	--	--	--

Domain	Mark	Description	Comment	Mark
Change of sign method (3)	1	The method is applied successfully to find one root of an equation.		
	1	Error bounds are stated and the method is illustrated graphically.		
	1	An example is given of an equation where one of the roots cannot be found by the chosen method. There is an illustrated explanation of why this is the case.		
Newton-Raphson method (5)	1	The method is applied successfully to find one root of a second equation.		
	1	All the roots of the equation are found		
	1	The method is illustrated graphically for one root.		
	1	Error bounds are established for one of the roots.		
Rearranging $f(x)=0$ in the form $x=g(x)$ (4)	1	An example is given of an equation where this method fails to find a particular root despite taking a starting value close to it. There is an illustrated explanation why this has happened.		
	1	A rearrangement is applied successfully to find a root of a third equation.		
	1	Convergence of this rearrangement to the root is demonstrated graphically and the magnitude of $g'(x)$ is discussed.		
	1	A rearrangement of the same equation is applied in a situation where the iteration fails to converge to the required root. This failure is demonstrated graphically and the magnitude of $g'(x)$ is discussed.		
Comparison of methods (3)	1	One of the equations used above is selected and the other two methods are applied successfully to find the same root.		
	1	There is a sensible comparison of the relative merits of the three methods in terms of speed of convergence.		
	1	There is a sensible comparison of the relative merits of the three methods in terms of ease of use with available hardware and software.		
Written Communication (1)	1	Correct notation and terminology are used		
Oral Communication (2)	2	Presentation	Please tick at least one box and give a brief report.	
		Interview		
		Discussion		
Half marks may be awarded but the overall total must be an integer				TOTAL/18

Coursework must be available for moderation by OCR

INSTRUCTIONS FOR COMPLETION OF THIS FORM

- 1 One form should be used for each candidate.
- 2 Please ensure that the relevant information is provided in the spaces at the top of the form.
- 3 Enter comments and mark awarded for each domain in the relevant boxes. Half marks are permissible, but the overall total out of 18 (see point 4) must be an integer.
- 4 Add up the marks awarded for all the domains to give an overall total out of 18. Enter this total in the relevant box.