Core Books in Advanced Mathematics

Curve sketching

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Macmillan Education

London and Basingstoke

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First published 1983

Published by
Macmillan Education Limited
Houndmills Basingstoke Hampshire RG21 2XS
and London
Associated companies throughout the world

Typeset in Hong Kong by Asco Trade Typesetting Ltd.

British Library Cataloguing in Publication Data

Kenwood, H. M.

Curve sketching. – (Core books in advanced mathematics)

I. Curve sketching

I. Title II. Plumpton, C.

III. Series

519.5'32 QA297.6

ISBN 978-0-333-34803-1 ISBN 978-1-349-06709-1 (eBook)

DOI 10.1007/978-1-349-06709-1

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Preface

Advanced level mathematics syllabuses are once again undergoing changes of content and approach, following the revolution in the early 1960s which led to the unfortunate dichotomy between 'modern' and 'traditional' mathematics. The current trend in syllabuses for Advanced level mathematics now being developed and published by many GCE Boards is towards an integrated approach, taking the best of the topics and approaches of the modern and traditional, in an attempt to create a realistic examination target through syllabuses which are maximal for examining and minimal for teaching. In addition, resulting from a number of initiatives, core syllabuses are being developed for Advanced level mathematics syllabuses, consisting of techniques of pure mathematics as taught in schools and colleges at this level.

The concept of a core can be used in several ways, one of which is mentioned above namely the idea of a core syllabus to which options such as theoretical mechanics, further pure mathematics and statistics can be added. The books in this series are core books involving a different use of the core idea. They are books on a range of topics, each of which is central to the study of Advanced level mathematics; they form small core studies of their own, of topics which together cover the main areas of any single-subject mathematics syllabus at Advanced level.

Particularly at times when economic conditions make the problems of acquiring comprehensive textbooks giving complete syllabus coverage acute, schools and colleges and individual students can collect as many of the core books as they need, one or more, to supplement books already possessed, so that the most recent syllabuses of, for example, the London, Cambridge, AEB and JMB GCE Boards, can be covered at minimum expense. Alternatively, of course, the whole set of core books gives complete syllabus coverage of single-subject Advanced level mathematics syllabuses.

The aim of each book is to develop a major topic of the single-subject syllabuses giving essential book work and worked examples and exercises arising from the authors' vast experience of examining at this level and including actual past GCE questions also. Thus, as well as using the core books in either of the above ways, they would also be ideal for supplementing comprehensive textbooks in the sense of providing more examples and exercises, so necessary for preparation and revision for examinations on the Advanced level mathematics syllabuses offered by the GCE Boards.

The ability to sketch a curve, given in cartesian, parametric or polar form, is

essential for A level mathematics and is the key to success in many aspects of the subject. In this particular book, we cover, from first principles, the requirements of non-specialist mathematicians in accordance with the core syllabus of pure mathematics now being included by GCE Examining Boards in Advanced level syllabuses and meet the requirements of the polytechnics and universities for entrants to degree courses in mathematics-related subjects.

The importance of technique – i.e. choice of suitable method – in tackling problems has been stressed, with the statement and proof of standard results kept to a minimum, or covered by worked examples. While inevitably lacking experience, the student should try to acquire and appreciate good technique, so that more difficult problems can be tackled confidently. Only the most elementary knowledge of coordinates has been assumed, and important basic results are listed for easy reference.

Plenty of examples are provided throughout the book, both as exercises and as part of the text; the worked examples sometimes give a comparison between good and bad methods. We are grateful to the following GCE Examining Boards for permission to reproduce questions from past Advanced level GCE papers:

University of London Entrance and School Examinations Council	(L)
The Oxford Delegacy of Local Examinations	(O)
University of Cambridge Local Examinations Syndicate	(C)
Oxford and Cambridge Schools Examination Board	(OC)
The Northern Universities Joint Matriculation Board	(JMB)
The Associated Examining Board	(AEB)
The Welsh Joint Education Committee	(W)

We are also grateful to Mrs Elizabeth Gilbert who typed the manuscript so well.

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