Review from *The Mathematical Gazette*, July 2013

Progress to Advanced Mathematics, by Mary Teresa Fyfe, Andrew Jobbings, Kitty Kilday and Mary Read. Pp. 168. £9.00 (pbk). 2011. ISBN 978 0 9555477 3 7 (Arbelos).

The chief failing of most current GCSE examinations is that they provide inadequate preparation for transition to A Level and equivalent courses. The content is sufficient, but the skills level is not. In particular, even candidates with an A* grade at GCSE may not have the algebraic skills needed to handle the working involved in A Level questions, while foundation-tier candidates are likely to be hopelessly at sea. Enthusiastic and hard-working pupils can easily become very dispirited when they can learn new techniques (such as differentiation) but are unable to get right answers because their skills level is inadequate. Three of the present authors attempted to fill that gap in the context of Scottish Highers with their previous book *Progress to Higher Mathematics* (Arbelos, 2007). I reviewed this in *The Mathematical Gazette*, March 2009, and have since used it successfully as an adjunct to other texts. The present book is similar in intent and scope, while being more explicitly aimed at the transition to A Level. There is no explanatory text, just exercises (with pre-section boxes saying "The following exercise will help you to . . . ") and answers. Some questions are classified as "foundation" with an anchor symbol, or "extension" with a snowflake symbol. The questions focus on the level of skills that is not tested by GCSE (where expressions are too often set up on a plate) but is essential for A Level; for instance, juxtaposing 'solve $\frac{1}{2}a = 3$' with 'solve $\frac{x}{4} = 2$', or 'make v the subject of the formula $E = \frac{1}{2}mv^2$'. Compound fractions are also dealt with. I have found the material on equations of straight lines and equations of curves especially valuable. The typesetting and diagrams are admirably clear, as one would expect from this source.

Compared with the previous book, the algebraic material has been considerably expanded and now starts at a pretty basic level (aimed, presumably, at those who are starting an A Level course from Foundation tier GCSE). For me, there is perhaps now too much material, in that the scale of the task looks rather more intimidating; it would be a pity if this were to discourage teachers and students from using the exercises selectively. Nor do I quite understand the logic behind the ordering of the sections. On the other hand, I should like to have seen a few more questions involving algebraic fractions with denominators either including common factors, or omitted. These, however, are minor criticisms.

There is a strong argument that increasing depth of understanding, by learning how to deal with harder questions, is educationally preferable to acceleration. This book provides plenty of material to assist the former, more thoroughly than in any A Level textbook I have seen. It, or its slimmer predecessor, is strongly recommended to all schools and colleges, but especially to those which offer no pure mathematics courses intermediate between CGSE and A Level.

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