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function P42 Geometry P43 The t substitution P44 A differential-difference equation P45 Lagrange's identity P46 Bernoulli polynomials P47 Vector geometry P48 Solving a quartic P49 Areas and volumes P50 More curve sketching P51 Spherical loaf P52 Snowploughing P53 Tortoise and hare P54 How did the chicken cross the road? P55 Hank's gold mine P56 A chocolate orange P57 Lorry on bend P58 Fielding P59 Equilibrium of rod of non-uniform density P60 Newton's cradle P61 Kinematics of rotating target P62 Particle on wedge P63 Sphere on step P64 Elastic band on cylinder P65 A knock-out tournament P66 Harry the calculating horse P67 PIN guessing P68 Breaking plates P69 Lottery P70 Bodies in the fridge P71 Choosing keys P72 Commuting by train P73 Collecting voles P74 Breaking a stick P75 Random quadratics -- Syllabus

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### Sommario/riassunto

This book is intended to help candidates prepare for entrance examinations in mathematics and scientific subjects, including STEP (Sixth Term Examination Paper). STEP is an examination used by Cambridge colleges as the basis for conditional offers. They are also used by Warwick University, and many other mathematics departments recommend that their applicants practice on the past papers even if they do not take the examination. Advanced Problems in Mathematics is recommended as preparation for any undergraduate mathematics course, even for students who do not plan to take the Sixth Term Examination Paper. The questions analysed in this book are all based on recent STEP questions selected to address the syllabus for Papers I and II, which is the A-level core (i.e. C1 to C4) with a few additions. Each question is followed by a comment and a full solution. The comments direct the reader's attention to key points and put the question in its true mathematical context. The solutions point students to the methodology required to address advanced mathematical problems critically and independently. This book is a must read for any student wishing to apply to scientific subjects at university level and for anybody interested in advanced mathematics.

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