

## Correspondence

### A prize problem

DEAR MR QUADLING,

I am writing to invite readers of the *Mathematical Gazette* to solve the following problem:

*It is required to find five positive integers such that the sum of any pair is a perfect square.*

It is known that this is possible. A prize of £25 is offered for the best solution received within three months of the publication of this letter. Entries should be sent to me at the address below.

Yours sincerely,

A. R. THATCHER

129 Thetford Road, New Malden, Surrey KT3 5DS

*Editorial note.* We are pleased to communicate Mr Thatcher's offer to readers, but must point out that this is a private offer for which the *Gazette* can accept no responsibility.

D.A.Q.

### Why are mechanics results so bad?

DEAR SIR,

May I, through your columns, enquire whether other readers are concerned about the standard of A level Mechanics?

Work and discussion with post-A level students over a number of years has led me to conclude that

- (a) Mechanics in single-subject Mathematics is probably more difficult than both Pure Mathematics and Statistics,
- (b) failure in Mechanics is believed by many students to account for their poor grades.

These expressions of opinion find support from some local teachers, from some university mathematicians, and in some GCE examiners' reports.

If these opinions do reflect a general attitude towards mechanics courses and examinations, this might account for the shortage of candidates for mathematics courses at tertiary level.

In an attempt to obtain data, on the basis of which more objective statements could be made, two investigations have been conducted.

The first examined a 10% sample of raw scores gained by candidates in A level examinations set by one of the bigger examining boards during the years 1972–4. Comparison was made of the grades awarded to candidates, taking Pure Mathematics-with-Mechanics or Pure Mathematics-with-Statistics, whose Pure Mathematics marks indicated they were of the same calibre. In the writer's opinion, candidates who combined Mechanics with Pure Mathematics did significantly less well.

The second investigation attempted, on a small scale, to identify the nature of candidates' difficulties in solving typical examination questions. Findings indicate that the most common sources are

- (i) failure to recognise the relevance of *all* information,
- (ii) failure to interpret the given information correctly in mathematical terms,

- (iii) failure to cope with the pure mathematics involved,
- (iv) insufficient time allowance.

It is worth noting that the principles of mechanics involved in the investigation appeared to be well understood.

The evidence to hand suggests that examining boards might do well to review the demands made of pupils by existing syllabuses and examinations. An exchange of views or accounts of work done on this problem would be welcome.

Yours faithfully,

T. LEDDY

*City of Liverpool College of Higher Education (C. F. Mott wing), Liverpool Road, Prescot, Lancs. L34 1NP*

## Reviews

**Concepts of modern mathematics**, by Ian Stewart. Pp ix, 315. 80p. 1975. SBN 0 14 021849 1 (Penguin)

In his preface, the author says that the purpose of the book is to provide a description of the aims, methods, problems and applications of modern mathematics, requiring from the reader no more than a smattering of algebra, geometry and trigonometry together with a mind receptive to new ideas. Clearly, he has set himself a challenging task.

I have my doubts whether he has quite succeeded in his declared aims, for a higher level of mathematical sophistication is required than he suggests. The adult or pupil whose mathematics stops at O level Additional Mathematics would find the book hard going. On the other hand the author succeeds very well in giving insights into pure mathematics with such clear exposition and obvious enthusiasm that an able sixth former, an undergraduate or a teacher would learn much about the underlying unity and flavour of mathematics and perhaps be spurred on to study the details of the subject.

There are exciting ideas and problems appearing here. The idea that Euclid rejected motion geometry because Zeno's paradoxes "proved" that motion was impossible is discussed; there is a splendidly accessible proof that the cube cannot be duplicated, an account of Gödel's theorem, a statement that the hairy ball theorem of topology implies that there must always be a cyclone somewhere on the earth's surface, and so on.

This is a quite splendid book which would be a bargain at ten times its price!

H. NEILL

*University of Durham Institute of Education, 48 Old Elvet, Durham DH1 3JH*

**The teaching of algebra at the pre-college level.** Proceedings of the third CSMP International Conference, edited by Peter Braunfeld and W. E. Deskins. Pp xv, 471. 1975 (CEMREL)

First, a word about CSMP—the Comprehensive School Mathematics Program, based at Southern Illinois University. The aim of this ambitious curriculum project is "the development of mathematics curricula which are sound in content, enjoyable to learn, and