

DEAR EDITOR,

I am prompted by Peter Mason's letter to outline the way of obtaining *all* triples of integers  $x, y, z$  such that  $x^2 + y^2 + z^2$  is the square of an integer, as many mathematics teachers seem unaware of it. The method of construction is to take any pair of integers  $a$  and  $b$  such that

$$ab \equiv a \text{ a perfect square (mod}(a + b)).$$

That is equivalent to there existing an integer  $c$  with  $ab + bc + ca$  a perfect square. (For example  $a = 2, b = 3$  gives  $2 \cdot 3 \equiv 1^2 \pmod{(2 + 3)}$  and then  $c$  can be taken as 2, 6, 15, ...)

Having obtained a suitable value of  $c$  we define  $x, y, z, N$  by the equations

$$2a = N + x - y - z \quad (1)$$

$$2b = N - x + y - z \quad (2)$$

$$2c = N - x - y + z \quad (3)$$

$$2(ab + bc + ca)^{\frac{1}{2}} = -N + x + y + z \quad (4)$$

It then turns out that  $x, y, z, N$  are integers satisfying

$$x^2 + y^2 + z^2 = N^2.$$

Furthermore, given  $x, y, z, N$  satisfying this last equation, integers  $a, b, c$  can be defined by (1), (2), (3): this ensures that they also satisfy (4) and hence that the whole process can be reversed. Therefore this method of construction is exhaustive, (For example

$$11^2 + 12^2 + 24^2 = 29^2$$

arises from  $a = 2, b = 3$  and  $c = 15$ .)

Yours sincerely,  
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## Reviews

**Diagnosis and prescription in the classroom**, by Ruth Rees and George Barr. Pp 228. £6.95. 1984. ISBN 0-06-318269-6 (Harper and Row)

This is an unusual book. Ruth Rees and George Barr have important things to say to teachers of mathematics from the primary stage to further education. The Brunel Mathematics Education Group (and in particular these two authors) have identified certain tasks in mathematics which cause difficulty to students over a wide age range. They call these tasks 'the core of common difficulty'. The book is intended to help teachers to explore their students' understanding of mathematics and, in so doing, concentrate on the core of common difficulty. The book is concerned with diagnosis and prescription across the ability range. This is not the first time that researchers have followed up their research with recommendations for teachers but its form is novel to the reviewer.

The book is intended to be of practical use to the teacher. Guidance is given to the reader in 'How to use this book', concluding with a paragraph which gives the authors' method of helping students with difficulties: "Give the diagnostic assessment. *Look ... Listen ... Learn ... Prescribe ...*" This pattern is exemplified in eight chapters on natural numbers, decimal fractions, common fractions, percentage-ratio-proportion, similarity, mensuration of the circle, algebra, and statistics. The prescription for each difficulty urges us (with a little variation) to aim to enhance our students' developments of CONCEPTS, COMPETENCE and CONFIDENCE by being AWARE, EXPLICIT and FLEXIBLE. The last three