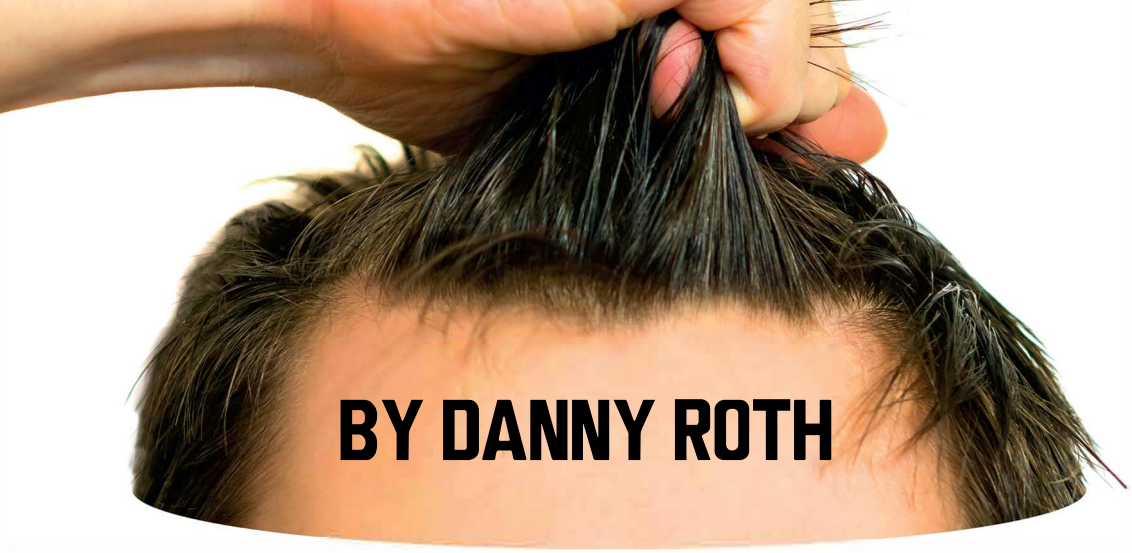


BY DANNY ROTH

SO, YOU THINK YOU HAVE GOT BRAINS?



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Publisher's Note

These are tough puzzles, and all the better for that. Tarquin produces many puzzle books to learn the techniques used if this proves tough - get a feel for some different types on www.halfahen.com if you want to see more. A few of our other problem books are visible at the back of the book.

Happy problem solving.

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Introduction

If you don't use it, you lose it!

That is a well-known proverb propounded by those in the medical and other associated professions who like to encourage people to take physical exercise regularly. However, many do not realize that this advice applies equally, if not more so, to the brain, one of the body's most important parts.

Newspapers, magazines and similar media often feature crossword puzzles, word-searches, general knowledge quizzes, problems on word games like Scrabble and other puzzles, typically on 'brain' games like chess and bridge. As one who has always been fascinated by mathematics, I should like to offer testing examples from the world of numbers which will require a fair amount of brain-work if you are to find correct solutions.

The world of numbers displays much variety and some strange traits. Did you know, for example, that if you take the nine-digit number 123456789 and multiply it by 8, the answer is 987654312? 'Why' one wonders, 'are those last two digits the wrong way round?' Multiplies of various numbers also have individual properties. A multiple of 3 will have digits which add up to an exact multiple of that digit. The

same applies to 9 but this does not necessarily apply to the other seven digits. However, they too have their own distinctions. A multiple of 5 will always end in 5 or 0. A multiple of 2 will have an even number as its last digit. A multiple of 4 will show that its last two digits are divisible by 4. Similarly, with 8, the last three digits are relevant. Multiples of 6 have to answer to multiples of 2 and 3. Only 7 is the odd one out. There is a rule for it, as you will see later, but it is much more complex than those applicable to the others.

Mathematical brain-teasers can be divided into a number of categories. In each case, I shall give guides as to how to approach the problems so that the time taken can be minimized. Hopefully, by the end you will be familiar with the recommended approaches and be able to solve problems set by others with the minimum of effort.

I am going to present the problems in small groups and then discuss the solutions. I shall start with those applicable to common or garden numbers and then I shall focus attention on the three ‘p’s, palindromes, primes and powers. Later, I shall go into geometry and examples where numbers can be substituted for letters. I hope you will enjoy the challenges.