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SYNOPSIS

Here is a "free sample":

M91. *Proposed by Robert Morewood, Burnaby South Secondary School, Burnaby, BC.*

Let k be a four-digit integer. Determine all possible values of k for which k^{2003} ends in the four digits **2003**. What happens if **2003** is replaced by **2002** or **2004**?

Soit k un nombre de quatre chiffres. Trouver toutes les valeurs possibles de k pour lesquelles le nombre k^{2003} se termine par **2003**. Qu'arrive-t-il si l'on remplace **2003** par **2002** ou **2004** ?

Featuring the 2000 Hungarian Mathematical Olympiad and the 2000 Iranian Mathematical Olympiad; readers' solutions to the Hungary-Israel Bi-National Mathematical Competition 1997; readers' solutions to some of the problems of the 36^{th} Armenian National Olympiad in Mathematics; readers' solutions to some of the problems of the Croatian National Mathematical Competition, Novi Vinodolski, IV^{th} Class, 1997; readers' solutions to some of the problems of the Croation National Mathematical Competition, Additional Competition for Selection of the 38^{th} IMO Team, 1997; and readers' solutions to some of the problems of the 1997 St. Petersburg City Mathematical Olympiad, Selection Round – 10^{th} Grade, and 11^{th} Grade;

There is a popular divisibility method used to find whether numbers are divisible by nine. You simply add the digits of the number together to get a new number (which is smaller than the number you started with). Then you add the digits of the new number. You repeat this process until you are left with a single-digit number. If the final number is 9, then the initial number is divisible by 9. If the final number is 8, then the remainder is 8, and so on.

Now we will try to find a divisibility theorem that works for division by any number ending in 9, such as 19.

Read on!

This month's "free sample" is:

2826. *Proposed by Bernardo Recamán Santos, Bogota, Colombia.*

Show that, for every sufficiently large integer n, it is possible to split the integers $1, 2, \ldots, n$ into two disjoint subsets such that the sum of the elements in one set equals the product of the elements in the other.

Montrer que pour tout entier n suffisamment grand, il est possible de séparer les entiers $1, 2, \ldots, n$ en deux sous-ensembles disjoints de telle sorte que la somme des éléments du premier soit égale au produit des éléments du second.