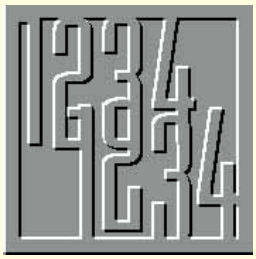

Pretty **poly!**

A Prime Number Problem followed by a Genial Gallimaufry!, presented by **Mike Mudge.**

PROBLEM ONE Polynomials with Many Successive Composite Values

If f(X) is an irreducible polynomial with integral coefficients (satisfying a certain condition), then, according to V.Bouniakowsky, there exists a smallest integer m greater than or equal to one such that f(m) is a prime. Denote this by p(f) *(Fig 1)*.

The smallest prime value of the last polynomial has no less than 70 digits.

K.S. McCurley considered p(Xd + k) maximised over k less than or equal to m and established *(Fig 2)*.

Results quoted from The Little Book of Big Primes by Paulo Ribenboim, Springer-Verlag, 1991. ISBN 0-387-97508-X. Investigate results of the above type, using polynomials chosen (systematically) by yourself and a region of integer arithmetic appropriate to the hard/soft-ware available. The idea being to, somehow, correlate everyone's attempts and form an overall picture of the behaviour of p(f) rather than just looking at rather esoteric computations such as those listed above.

Feedback, both positive and negative

David Wells, the author of The Penguin Book of Curious and Interesting Numbers, can be contacted c/o Penguin Books Ltd, 27 Wrights Lane, London W8 5TZ. He has indicated that Penguin has no intention of producing a revised edition in the foreseeable future, although he has enough material to markedly increase its size.

Fig 1

f(X)	f(m) is composite for all m upto:	p(f)
x^6	3905	3906
x^6 + 1091	7979	7980
x^{12} + 82991	170624	170625
X^{12} + 488669	616979	616980

Fig 2

d	m	max p(X^d + k)
2	10^6	p(X^2 + 576239) = 402
3	10^6	p(X^3 + 382108) = 297
4	150000	p(X^4 + 72254) = 2505
5	10^5	p(X^5 + 89750) = 339

Mark Lewis of Bristol refers readers to the "most interesting combinations problem" from a recent *Sunday Times* Brainteaser:

How many ways can n-bubbles be nested? e.g. n=3 we find b(3) = 4, thus

Show that b(10) = 1,842... regard this as PROBLEM (STB).

Jason Moxham of Southampton has now found a multi-perfect number approximately

6.2234×10^{449}

such that sigma(x_0 = 9x. He is attracted to the problem of ten-fold perfect numbers but still has a total of only 1,143 compared with the 1,605 cited by R.K. Guy in the new edition of Unsolved Problems in Number Theory. Any advice for Jason?

Gareth Suggett of Worthing, a very regular correspondent, wonders: Would a *Numbers Count* World Wide Web page have any value? He sees a big problem in that the HTML coding system used for most Web pages is no better at handling mathematical equations than whatever typesetting system *PCW* currently uses. However, MathSoft, the producer of Mathcad, has now issued its own free Web browser which will read Mathcad documents as well as HTML. Comments?

Robert Matthews has written to give the substantive reference to his article "Pi in the sky" (see *Numbers Count*, *PCW* July 1995; *Nature*, volume 374, 20 April 1995, pp681/2). It is clear from this article that 10_6 random numbers were sampled, *not* 10_2 as reported by Adrian Berry.

Steve Leach of Banbury refers to some alternative astronomical investigation involving random distributions: this involved the distribution of craters on the surface of Venus and is alleged to have disproved the existence of active volcanoes. Does anyone have further details of this study? In particular the tests for randomness.

I have recently been made aware of a publication called M500, ISSN 1350-8539, published by the M500 Society of The Open University "providing a forum for the publication of its readers' mathematical interests". I am not sure if it is available to a general readership but certainly some of its material would interest *Numbers Count* readers. Response from an M500 member would be appreciated.

Complete or partial responses to the problems presented here may be sent to Mike Mudge, 22 Gors Fach, Pwll-Trap, St. Clears, Carmarthen, Dyfed SA33 4AQ, tel 01994 231121, to arrive by 1st September 1995. Solutions received will be judged using suitable subjective criteria, and a prize in the form of a £25 book token, or equivalent overseas voucher, will be awarded by Mike Mudge to the "best" solution arriving by the closing date. Such contributions should contain a brief description of the hardware used together with details of coding, run times and a summary of the results obtained. Additionally, readers' comments upon the general or specific structure of this article would be welcome.

PCW Contributions Welcome

Mike Mudge welcomes readers' correspondence on any subject within the areas of number theory and computational mathematics, together with suggested subject areas and/or specific problems for future Numbers Count articles.