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SYNOPSIS

321 Skoliad: No. 112 Robert Bilinski

- Concours de Mathématiques des Ecoles Secondaire de Columbie Britannique 2008
- British Columbia Secondary School Mathematics Contest 2008
- solutions to the 2007 Maritime Mathematics Competition

327 Mathematical Mayhem Ian VanderBurgh

327 Mayhem Problems: M357–M362
329 Mayhem Solutions: M313–M324
338 Problem of the Month Ian VanderBurgh

341 The Olympiad Corner: No. 272 R. E. Woodrow

Featuring the Olimpiada Matemática Española 2005 (selected questions); the 54th Czech Mathematical Olympiad 2004/5; the 23rd Iranian Mathematical Olympiad 2005-2006; the Romanian Mathematical Olympiad 2006; and readers’ solutions to some of the problems from

- the 2004 Taiwanese Mathematical Olympiad;
- the 25th Albanian Mathematical Olympiad for High Schools (Test 2);
- the XXV Brazilian Mathematical Olympiad 2003;
- the Second and Third Selection Tests of the 2004 Republic of Moldova.

356 Book Reviews John Grant McLoughlin

356 Calculus Gems: Brief Lives and Memorable Mathematics by George F. Simmons
Reviewed by Robert D. Poodiack

357 From Zero to Infinity: What Makes Numbers Interesting by Constance Reid
Reviewed by John Grant McLoughlin
The Sum of a Cube and a Fourth Power

by Thomas Mautsch and Gerhard J. Woeginger

The authors discuss the solvability of $x^3 + y^4 \equiv r \pmod{n}$ in integers $x$ and $y$. They show a solution $(x, y)$ exists for any integer $r$, so long as $n$ is not divisible by the unlucky prime 13. They give a short list of some other congruences of the form $x^{k_1} + y^{k_2} \equiv r \pmod{n}$ and the associated unlucky primes, which are always finite in number. Finally, they show that these unlucky primes are in fact quite lucky, by offering the reader five number-theoretic problems whose solutions hinge on finding an unlucky prime and working modulo that prime.

Are you feeling lucky?

Enjoy!

Problems: 3363–3375

This month’s “free sample” is:

3367. Proposed by Li Zhou, Polk Community College, Winter Haven, FL, E-U.

Soit $p(x) = a_n x^n + a_{n-1} x^{n-1} + \cdots + a_1 x$ un polynôme à coefficients entiers, où $a_n > 0$ et $\sum_{k=1}^{n} a_k = 1$. Existe-t-il, oui ou non, une infinité de paires d’entiers positifs $(k, \ell)$ tels que $p(k + 1) - p(k)$ et $p(\ell + 1) - p(\ell)$ soient relativement premiers.

3367. Proposed by Li Zhou, Polk Community College, Winter Haven, FL, USA.

Let $p(x) = a_n x^n + a_{n-1} x^{n-1} + \cdots + a_1 x$ be a polynomial with integer coefficients, where $a_n > 0$ and $\sum_{k=1}^{n} a_k = 1$. Prove or disprove that there are infinitely many pairs of positive integers $(k, \ell)$ such that $p(k + 1) - p(k)$ and $p(\ell + 1) - p(\ell)$ are relatively prime.

Solutions: 3263–3275, 3282