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SYNOPSIS

257 Skoliad: No. 71 *Shawn Godin*

2003 Fryer Contest
Nineteenth W.J. Blundon Mathematics Contest (2002)
Solutions to the 2nd Junior Balkan Mathematical Olympiad (1998)
Solutions to the 2002 British Columbia Colleges Junior High School
Mathematics Contest, Preliminary Round

265 Mathematical Mayhem

265 Mayhem Problems: M101–M106

Here is a “free sample”:

M105. *Proposed by Andrew Critch, Clarenville High School, Clarenville, NL.*

Suppose that the roots of $P(x) = x^3 - 2kx^2 - 3x^2 + hx - 4$ are distinct, and that $P(k) = P(k + 1) = 0$. Determine the value of h .

.....

On suppose que les racines de $P(x) = x^3 - 2kx^2 - 3x^2 + hx - 4$ sont distinctes, et que $P(k) = P(k + 1) = 0$. Trouver la valeur de h .

267 Mayhem Solutions: M51–M56

272 Pólya’s Paragon *Paul Ottaway*

275 Binomial Inversion: Two Proofs and an Application to Derangements *Heba Hathout*

279 The Olympiad Corner: No. 231 *R.E. Woodrow*

Featuring the 2000 International Mathematical Olympiad Shortlisted Problems; and readers’ solutions to some of the problems of

- the Vietnamese Mathematical Competition 1997;
- the Turkey Team Selection Examination for the 38th IMO 1997;
- the Chilean Mathematical Olympiads 1994–95;

- the 28th Austrian Mathematics Olympiad 1997;
- the Íslenska Staerðfræðikeppni Framhaldsskólanema 1995–1996.

306 Book Reviews *John Grant McLoughlin*

306 *Inverse problems - Activities for Undergraduates*

by Charles W. Groetsch

Reviewed by Edward Vrscay

308 *Challenging Brainteasers*

by Bernardo Recamán Santos

Reviewed by Sandy Graham

309 An Elementary Proof of the Inequality: $\text{variance} \leq (M - \bar{x})(\bar{x} - m)$

Vedula M. Murty

The inequality in the title has recently been established by Bhatia and Davis using calculus. This note proves the result without using calculus.

311 A Simple Irreducibility Criterion for $f(X^2)$

Natalio Guersenzvaig

Let k be any field, and let $f(X)$ be an arbitrary polynomial of $k[X]$ which is irreducible in $k[X]$. A result of Wahlen-Capelli establishes necessary and sufficient conditions for the irreducibility of $f(g(X))$ in $k[X]$, where $g(X)$ is any polynomial of $k[X]$. The proof of this result is not elementary because it uses the theory of field extensions.

The author establishes necessary and sufficient conditions for the reducibility of $f(X^2)$ in $Z[X]$, where Z denotes an arbitrary unique factorization domain. As an immediate consequence we obtain a simple sufficient condition for the irreducibility of $f(X^2)$ in $Z[X]$.

Read on!

314 Problems: 2827, 2829, 2839 (all corrected); 2851—2863

This month's "free sample" is:

2854. *Proposed by Toshio Seimiya, Kawasaki, Japan.*

Suppose that M and N are the mid-points of the sides AB and CD of quadrilateral $ABCD$, respectively.

Prove that $AN^2 + DM^2 + BC^2 = BN^2 + CM^2 + AD^2$.

.....

Supposons que M et N sont les points milieu respectifs des côtes AB et CD d'un quadrilatère $ABCD$.

Montrer que $AN^2 + DM^2 + BC^2 = BN^2 + CM^2 + AD^2$.

320 Solutions : 2289, 2741, 2745, 2751–2765, 2767