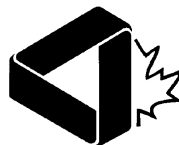


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SYNOPSIS

257 The Academy Corner: No. 34 *Bruce Shawyer*

Featuring the Memorial University Undergraduate Mathematics Competition, March 2000; and the Bernoulli Trials 2000, from Christopher G. Small & Byung Kyu Chun of the University of Waterloo

261 The Olympiad Corner: No. 207 *R.E. Woodrow*

Featuring the Swedish Mathematical Competition, Final Round, November, 1996; the 48th Polish Mathematical Olympiad, Final Round, written April 4–5, 1997; the 18th Brazilian Mathematical Olympiad; the Selection Test for the Vietnamese Team 1997, written May 16–17, 1997; readers' solutions to problems of the Bundeswettbewerb Mathematik, Second Round 1995; to the First Round 1996 of the Bundeswettbewerb Mathematik; and to problems of the XLV Lithuanian Mathematical Olympiad 1996.

278 Book Reviews *Alan Law*

Geometry from Africa — Mathematical and Educational Explorations by Paulus Gerdes, Reviewed by *Julia Johnson*, University of Regina, Regina, Saskatchewan.

280 Some bounds for $\phi(n)\sigma(n)$

Edward T.H. Wang

Let \mathbb{N} denote the set of all natural numbers. In elementary number theory, three multiplicative functions which are discussed most frequently are $\tau(n)$, the number of (positive) divisors of $n \in \mathbb{N}$; $\sigma(n)$, the sum of all the divisors of n ; and $\phi(n)$, Euler's totient function; that is, the number of positive integers in $\{1, 2, \dots, n\}$ which are coprime with n .

Though there are well-known formulae for computing the exact values of these functions, these formulae all depend on the actual prime power factorization of the natural number n . Hence it is of interest to find upper and lower bounds for these functions, preferably in terms of n only. Indeed, examples of such bounds abound in the literature.

Read on!

- 284 Letter to the Editor *David Singmaster*
 Regarding: Trevor Lipscombe & Arturo Sangalli; The Devil's dartboard
 [2000 : 215].
- 286 The Skoliad Corner: No. 46 *R. E. Woodrow*
 Featuring the preliminary round of the Junior High School Mathematics
 Contest of the British Columbia Colleges, March 8, 2000; and short
 "official" solutions to the Federal Contest in Mathematics (Germany)
 1997.
- 291 Mathematical Mayhem
 291 Shreds and Slices
 On Logarithms
 297 Mayhem Problems
 297 High School Problems **H273–H276**
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 299 1960 Bulgarian Mathematical Olympiad 1960
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 302 Problem of the Month *Jimmy Chui*

177 Problems: 2551—2562

This month's "free sample" is:

2551. *Proposed by Panos E. Tsaoussoglou, Athens, Greece.*

Suppose that a_k ($1 \leq k \leq n$) are positive real numbers. Let $e_{j,k} =$
 $(n - 1)$ if $j = k$ and $e_{j,k} = (n - 2)$ otherwise. Let $d_{j,k} = 0$ if $j = k$
 and $d_{j,k} = 1$ otherwise.

Prove that

$$\prod_{j=1}^n \sum_{k=1}^n e_{j,k} a_k^2 \geq \prod_{j=1}^n \left(\sum_{k=1}^n d_{j,k} a_k \right)^2 .$$

180 Solutions: 2436, 2451—2459