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SYNOPSIS

193 The Academy Corner: No. 19 *Bruce Shawyer*

Featuring a complete set of solutions to the 1997 Memorial University Undergraduate Mathematics Competition from Solomon Golomb.

196 The Olympiad Corner: No. 190 *R.E. Woodrow*

Featuring the problems of the Grade XI and Grade XII versions of the Lithuanian Mathematical Olympiad; the problems of the Korean Mathematical Olympiad; problems selected from the 1995 Israel Mathematical Olympiads; solutions to problems posed in the February 1997 number of the Corner; readers' solutions of problems from the March 1997 Corner and the 3rd Mathematical Olympiad of the Republic of China (Taiwan); solutions of Selected Problems from the Israel Mathematical Olympiads, 1994; and solutions to Problems From the Bi-National Israel–Hungary Competition, 1994.

208 Book Review *Andy Liu*

Mathematical Challenge by Tony Gardiner

More Mathematical Challenges by Tony Gardiner

Reviewed by *Ted Lewis*, University of Alberta

210 A Note on Special Numerals in Arbitrary Bases

Glenn Appleby, Peter Hilton and Jean Pedersen

In [1], at the end of a section devoted to the Pigeonhole Principle, the author posed the following problem:

> "4.2.28 Show that, for any integer n, there exists a multiple of n that contains only the digits 7 and 0."

Plainly the author is referring to the representation of the multiple as a numeral in base 10. Thus the reader of the problem is encouraged to believe that the validity of the statement depends in some way on the numbers 7 and 10 and their mutual relationship. Our analysis of the problem shows that, in fact, we may replace 10 by any base $b \geq 2$, and 7 by any digit t in base b.

Read on!

Reference [1] Zeitz, Paul, *The Art and Craft of Problem Solving*, John Wiley & Sons, 1998.

This month's "free sample" is:

2342. *Proposed by D.J. Smeenk, Zaltbommel, the Netherlands.*

Given A and B are fixed points of circle Γ. The point C moves on Γ, on one side of AB. D and E are points outside $\triangle ABC$ such that $\triangle ACD$ and $\triangle BCE$ are both equilateral.

(a) Show that CD and CE each pass through a fixed point of Γ when C moves on Γ.

(b) Determine the locus of the midpoint of DE.