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### SYNOPSIS

#### 241 Dissecting Squares into Similar Rectangles

*B-Y. Chun, A. Liu & D. van Vliet*

Karl Scherer and Martin Gardner have proposed the following three-part problem. Cut a square into three similar pieces, where

- (1) all three are congruent;
- (2) exactly two are congruent;
- (3) no two are congruent.

Note that (2) really consists of two sub-problems, where the congruent pieces are

- (2a) smaller than the third;
- (2b) larger than the third.

All their solutions to (2) are to (2a). It appears that, alas, (2b) is not to be. Also considered in Scherer and Gardner's note are related dissections of an equilateral triangle, but they do not concern us here.

We generalize the problem of Scherer and Gardner for the square as follows. Given any integer  $m > 1$  and any of its  $2^{m-1}$  compositions, or ordered partitions,  $m = a_1 + a_2 + \cdots + a_n$ , dissect a square into  $m$  similar pieces so that there are  $a_1$  congruent pieces of the largest size,  $a_2$  congruent pieces of the next largest size, and so on. In the original problem,  $m = 3$  and the compositions are: (1) 3; (2a) 1 + 2; (2b) 2 + 1; (3) 1 + 1 + 1.

Our main result is that the dissection problem always admits a solution using rectangular pieces if and only if the composition is not of the form  $k + 1$ , where  $k$  is any positive integer. These solvable cases are covered by two constructions which are only slightly different.

#### 249 The Skoliad Corner: No. 16    *R.E. Woodrow*

Featuring the 1995 Saskatchewan Senior Mathematics Contest and the solutions to the 1996 American Invitational Mathematics Examination.

251 The Olympiad Corner: No. 176 *R.E. Woodrow*

Featuring the 10th Iberoamerican Mathematical Olympiad, the 19th Belgian Mathematical Olympiad (in French), the “official” solutions to the 1996 Canadian Mathematical Olympiad, and readers’ solutions to the Second Stage Exam of the 10th Iranian Mathematical Olympiad.

268 The Academy Corner: No. 5 *Bruce Shawyer*

Featuring solutions to the second three problems in the 1995 Memorial University Undergraduate Mathematics Competition.

271 Book Review *Andy Liu*

**Experience in Problem Solving - a W. J. Blundon Commemorative**, edited by R. H. Eddy and M. M. Parmenter. Published by the Atlantic Provinces Council on the Sciences, 1994, is reviewed by **Murray S. Klamkin**, University of Alberta.

273 Problems: 2164–2176

This month’s “free sample” is:

**2175.** *Proposed by Christopher J. Bradley, Clifton College, Bristol, UK.*

The fraction  $\frac{1}{6}$  can be represented as a difference in the following ways:

$$\frac{1}{6} = \frac{1}{2} - \frac{1}{3}; \quad \frac{1}{6} = \frac{1}{3} - \frac{1}{6}; \quad \frac{1}{6} = \frac{1}{4} - \frac{1}{12}; \quad \frac{1}{6} = \frac{1}{5} - \frac{1}{30}.$$

In how many ways can the fraction  $\frac{1}{2175}$  be expressed in the form

$$\frac{1}{2175} = \frac{1}{x} - \frac{1}{y},$$

where  $x$  and  $y$  are positive integers?

276 Solutions: 1987, 2067, 2069–2071, 2073–2075, 2077