Proposals To be considered for publication, solutions to the following problems should be received by January 10, 2007.

S113. *Proposed by Lou Zocchi, Biloxi.* Divide each face of a cube into four isosceles right triangles by its diagonals. Label the 24 triangles so obtained with the numbers from 1 to 24, using each of them exactly once, such that the following conditions are satisfied:

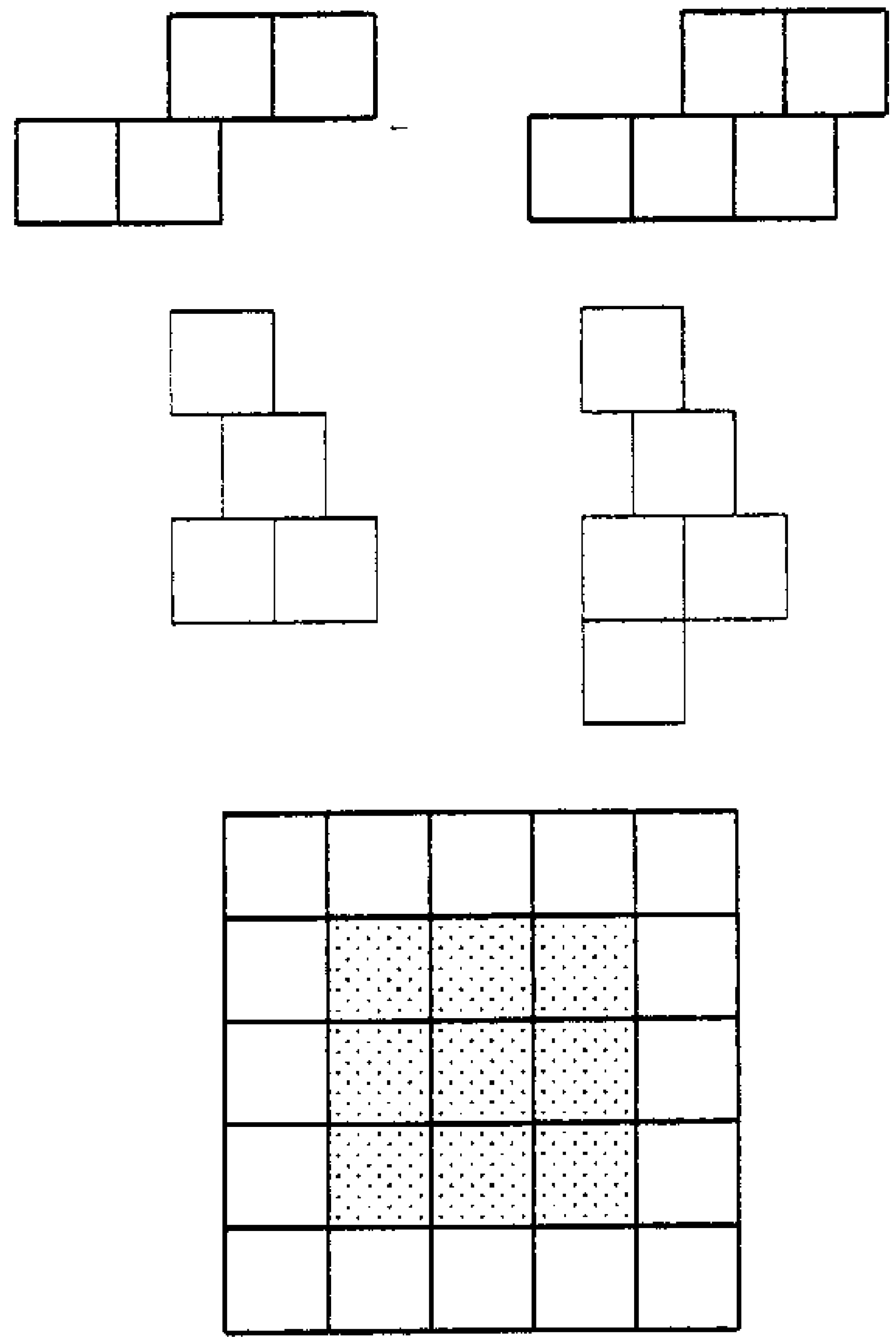
1. The sum of the numbers on the four triangles of each face of the cube is exactly 50.
2. The sum of the numbers on two opposite triangles is exactly 25. (Two triangles are opposite if they lie on opposite faces of the cube and their hypotenuses are opposite edges of the cube.)
3. The sum of the numbers on the six triangles surrounding each vertex of the cube is as close to 75 as possible.

S114. *Proposed by Linda Yu, Montreal.* In a chess tournament, each of the 89 participants plays a game against each of the other 88. A win is worth 1 point, a draw 1/2 point and a loss 0 points. A participant's score is the sum of the points gained from all 88 games. After the tournament, each of the

$$\binom{89}{2} = 3916$$

games is reviewed. A game is called an upset if it is not a draw, and the score of the winner is lower than that of the loser. Is it possible for the number of upsets to exceed 2000?

S115. *Proposed by Rikishi Yamada, research biologist, Tokushima University.* Two of the following four pieces have area 4 and the other two have area 5. Place all of them into the square board of area 25, without overlap, so that the central 3×3 subboard is completely covered up. The pieces may be rotated or reflected.



Problem 205. *Proposed by Árpád Bényi, Western Washington University.* In the quadrilateral $ABCD$, both AD and BC are perpendicular to AB. The diagonals AC and BD have respective lengths 3 and 2, and they intersect at the point O. Let E be the foot of perpendicular from O to AB. If $OE = 1$ and $f(x) = \frac{x^2+x+1}{\sqrt{4x^2+2x+1}}$, determine $f(\frac{BE}{AE})$.

Problem 206. *Proposed by Paolo Perfetti, Università degli studi di Tor Vergata Roma.* Let $\{a_i\}$ be an infinite sequence of nonnegative real numbers with a finite sum. Determine

$$\lim_{n\to\infty} \sum_{k=n+1}^{2n} \frac{k}{n} \left(\prod_{j=1}^{n} a_{k+j} \right)^{\frac{1}{n}}.$$

Solutions: