

The János Bolyai Mathematical Society announced the József Kürschák Mathematics Competition of 2002 to be held at 2 pm on the 25th of October, at the following 20 venues: Békéscsaba, Bonyhád, Budapest, Debrecen, Eger, Győr, Kaposvár, Kecskemét, Miskolc, Nyíregyháza, Pécs, Salgótarján, Sopron, Szeged, Székesfehérvár, Szolnok, Szombathely, Tatabánya, Veszprém, Zalaegerszeg.

The executive board of the Society appointed the following committee to organize the competition:

M. Bárácz, P. Bártfai, P. Benczúr (secretary), *L. Csirmaz, T. Fleiner, P. Frenkel, Gy. Károlyi* (chair), *G. Kós, L. Pálmai, J. Pelikán, I. Reiman, J. Surányi* (honorary chair).

At their June 14 meeting the Committee (without L. Pálmai, who excused himself) selected the following problems:

1. *The sides of an acute-angled triangle are pairwise different, its orthocentre is M , the centre of its inscribed circle is K , and the centre of its circumscribed circle is O . Prove that if a circle passes through the points K , O , M and a vertex of the triangle, then it also passes through another vertex.*

2. *Consider the sequence of the Fibonacci numbers defined by the recursion $f_1 = f_2 = 1$, $f_n = f_{n-1} + f_{n-2}$ ($n \geq 3$). Assume that the fraction $\frac{a}{b}$, where a and b are positive integers, is smaller than one of the fractions $\frac{f_n}{f_{n-1}}$ and $\frac{f_{n+1}}{f_n}$ but is greater than the other. Show that $b \geq f_{n+1}$.*

3. *Prove that the set of edges formed by the sides and diagonals of a convex 3^n -gon can be partitioned into sets of three edges, such that the edges in each triple form a triangle.*

The Committee examined the papers submitted by the candidates, and the December 6 assembly adopted the following report unanimously:

„The competition has taken place in an orderly fashion at all venues. In Budapest, 84 out of the 96 participants submitted a paper, and 84 papers we received from elsewhere in Hungary. Twenty candidates showed significant work on at least two problems, and several correct solutions were received for each problem.

Rácz, Béla András solved all three problems correctly. In addition, he stated and proved a graph theoretical generalisation of the third problem. Therefore, the

First József Kürschák Prize and 30 000 HUF were awarded to

Rácz, Béla András, 11th-grade student of Fazekas Mihály Gimnázium, Budapest. His teachers are A. Hráskó, L. Surányi, T. Fazakas and L. Pósa.

Csikvári, Péter solved all three problems, apart from minor inaccuracies. Therefore, the

Second József Kürschák Prize and 24 000 HUF were awarded to

Csikvári, Péter, who has graduated from Fazekas Mihály Gimnázium, Budapest. His teachers were T. Fazakas, M. Táborné Vincze and L. Pósa. Now he is a first-year student of mathematics at the Faculty of Science, Eötvös Loránd University (ELTE), Budapest.

Csóka, Endre and Kocsis, Albert Tihamér solved the second two problems properly, but their solutions given to Problem 1 were not complete. Therefore, the

Third József Kürschák Prize and 18 000 HUF each were awarded to

Csóka, Endre, 12th-grade student of Fazekas Mihály Gimnázium, Debrecen, whose teachers are T. Balázs and L. Pósa; and

Kocsis, Albert Tihamér, 11th-grade student of Fazekas Mihály Gimnázium, Budapest. His teachers are A. Hráskó and L. Surányi.

Kovács, Erika Renáta and Harangi, Viktor solved the first and third problems. Although there are errors in their solutions to the second problem, these errors can be easily eliminated. Harangi, Viktor gave an exceptionally elegant proof for the first problem. Therefore,

A certificate of distinction and 6000 HUF each were awarded to

Kovács, Erika Renáta, who has graduated from Fazekas Mihály Gimnázium, Budapest, as a student of T. Fazakas, M. Táborné Vincze and L. Pósa, currently a first-year student of mathematics at the Faculty of Science, Eötvös Loránd University (ELTE), Budapest; and

Harangi, Viktor, who has graduated from Fazekas Mihály Gimnázium, Budapest. His teachers were M. Táborné Vincze and L. Pósa. He is currently a first-year student of mathematics at the Faculty of Science, Eötvös Loránd University (ELTE), Budapest.”