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12th Middle European Mathematical Olympiad

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MEMO

MEMOLETTER

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The University of Bielsko-Biala

Akademia Techniczno-Humanistyczna w Bielsku-Białej

The University of Bielsko-Biala (Akademia Techniczno-Humanistyczna w Bielsku-Białej) was founded in October 2001 as an independent governmental academic institution. Previously, since 1969, it had been a branch of the Lodz University of Technology (Politechnika Łódzka).

At present there are about 5000 students studying at five faculties of the university which employs experienced academic staff including professors and other specialists. Their number is constantly growing and currently there work about 350 teaching staff.

The University of Bielsko-Biala is open to new ideas and opportunities to improve modern educational tools. Internationalization has become here the most important objective of the university being constantly promoted through its participation in various European network projects. The university cooperates with institutions from all over the world and the number of agreements is growing rapidly each year – nowadays the University of Bielsko-Biala has 85 agreements with over 20 countries.

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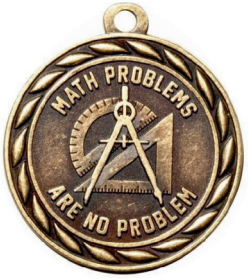
MEMO 2010

Individual competition

We are given a cyclic quadrilateral $ABCD$ with a point E on the diagonal AC such that $AD = AE$ and $CB = CE$. Let M be the center of the circumcircle k of the triangle BDE. The circle k intersects the line AC in the points E and F. Prove that the lines FM, AD and BC meet at one point.

Can you solve it?



The Scottish Café

In the mid-war Lwow, which was then a valued scientific centre, in the Academic Square (Pol. Plac Akademicki) a fabulous Scottish Café operated. It was a meeting point for the most extraordinary personalities and distinguished mathematic minds concentrated around the founders of the Lwow School of Mathematics — Hugo Steinhaus and Stefan Banach.

"Important mathematical dilemmas are thought by most people to be solved in peace and silence of the universities and institutes. However, a genius solution can emerge from the cigarette smoke in a buzzy café."

The former was a well-known and valued mathematician of exceptional personal culture. As a language purist he remitted, without opening, every single wrongly addressed letter and turned back anybody if they made a mistake while introducing themselves by saying their surname before the first name. He amused others by playing with the language, creating fabulous "hugenots" — witty charades and wordplays, which afterwards were gathered and published in one book as "Rational dictionary". His most iconic piece of work in the area of popularization of mathematics is "A Mathematical Caleidosdcope" — a magazine published for the first time in 1938 and translated into 10 languages. Steinhaus was the founder of the probability and the modern games theory, but his most significant accomplishments were made in the area of the functional analysis. In 1929, in collaboration with Stefan Banach, he founded the "Studia Mathematica" — a professional periodical of international range dedicated exclusively to this field of mathematics. The cooperation between the two mathematicians resulted in formulation of a theorem of the sequence of linear operations, which is extremely meaningful in the functional analysis. Hugo Steinhaus is also a creator of an introviser — a device used to locate foreign objects in the organism by X-radiation. However, Steinhaus claimed that his greatest revelation was... Stefan Banach.

Today he is one out of three, along with Copernicus and Marie Curie-Skłodowska, regarded as the most valuable Polish scientist in the world. He contributed to mathematics with the Banach spaces and the extensive development of the functional analysis. Stefan Banach was born as an extramarital son of a civil servant and an illiterate mountain woman and is said to have never met his mother and occasionally seen his father. Brought up by a washer-woman in a foster family in Kraków, he started to make his living betimes, working as a bookseller, a supernumerary in the opera and a tutor. In spite of having studied engineering for two years, he failed to achieve master's degree. Stefan Banach was a self-thought mathematician.

One summer evening, while Hugo Steinhaus was strolling in the Planty park, on a bench he saw Banach and heard him talking with someone about "Lebesgue's integer", known only to the mathematicians. After a short conversation with him he was certain that he was to do with a genius.

Thanks to Steinhaus, despite not having a master's degree, Stefan Banach started his scientific career at the University of Lwow. Although he was given one condition: he had to write a doctoral dissertation in one year. Because Banach was not keen on meeting the deadline set by the rector, Steinhaus appointed several assistants whose duty was to write down the thoughts of the mathematician. After a period of time they assembled everything and submitted a ready task to the rector of the university. But there was a problem. The dissertation was a subject to the doctoral defence. Therefore another artifice was used. Banach was informed that a group of scientists had arrived at the secretary office of the university and they asked him for help to solve a mathematical dilemma. That is how the mathematician appeared before the Examination Committee and unconsciously succeeded in defending his PhD dissertation.

Banach was never a typical lecturer. Instead of a tie, popular among the professors of that time, he always had a lit cigarette in his mouth. He loved to sit around in café and bars, several times he even gave a lecture directly after a party.

The extraordinary mathematician became legendary in his lifetime. Along with the elegant and sophisticated Steinhaus they made an incredible duet, attracting many uncommon mathematical minds to the "Scottish Café." Apart from Banach and Steinhaus, two more names are widely recognised among the mathematicians associated with the café: Stanisław Ulam — a scientist involved in the construction of a nuclear bomb and a moon landing mission and Stanisław Mazur — an extremely intelligent mathematician with a peculiar sense of humor and the father of Krystyna Mazurówna — a future fabulous dancer and choreographer of the Polish and Paris scene.

In the beginning, the notes in the Scottish Café were made on the top of marble tables. However, after a meeting a cleaning lady wiped off the top of the table, discarding hours of work of mathematicians and invaluable proofs. Therefore, after some time a marble-covered notebook called "Scottish Book" appeared in the café on the initiative of Łucja — Stefan Banach's wife. It was managed by a cloakroom attendant and made available to anybody who wanted to solve or write their own mathematical problem. For the solution of tasks one could get unusual awards: a little cup of black coffee, a bottle of wine, 10 dag of caviar, 1 kg of bacon or … a living goose.

In 1936 Stanisław Mazur proposed a goose as an award for solving a certain task. In 1972, 36 years later, a Swedish mathematician Per Enflo gave the correct answer. The designated goose was given to him and the photo of the ceremony was spread around the globe. The goose did not return home with its owner, but was eaten during the dinner in companion of other mathematicians.

The first inscription in the Scottish Book dates back to June 1935 and the last one to May 1943. Thanks to Łucja Banach it survived German occupation. In the 50s, on the initiative of Stefan Ulam the book was translated, copied and sent around as a tapescript to mathematicians around the world. In 1977 a reprint of the tapescript appeared, and then after four years an English version with comments was published under the name "The Scottish Book: Mathematics from the Scottish Café."

Today in the meeting point of the founders of the Lwow School of Mathematics there is a bank. The Scottish Café, although inexistent today, has successfully entered our mathematical imagination.

This picture and text come from:
https://kawiarniaszkocka.matmatic.pl

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Organisers and Partners MEMO 2018

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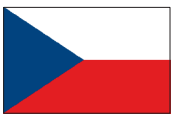
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