## Mathematics Education in Secondary Schools for Boys in 19th-Century Poland: Schools with Polish, Prussian, Austrian, and Russian Curricula

## Karolina Karpińska

PL - Theme 5

L.&A. Birkenmajer Institute for the History of Sciences, Polish Academy of Sciences, Warsaw, Poland

At the end of the 18th century, Poland was partitioned three times. As result of the third partition in 1795, Poland vanished from the map of Europe, with its lands seized by three powers: Prussia, Russia, and Austria. Consequently, in the 19th century, schools in Polish territories operated under Polish, Prussian, Russian, and Austrian educational systems. This paper discusses the distinctive features of mathematics education according to which of these systems was implemented. Special attention is given to schools preparing students for matriculation examinations, such as gymnasia and real-type schools. Curricula, textbook contents, and sets of matriculation exam problems are characterized. Scientific publications by teachers are particularly valuable in this context, as they frequently discussed selected topics covered in schools. These publications provide insight into how teachers independently modified curricula to best prepare students for efficient functioning in everyday life as well as for university studies. Special attention is paid to the application of arithmetic and algebra in daily life, specifically, the so-called "citizen calculations", which include the calculation of pensions, annuities, and financial transactions related to banking. Moreover, in the 19th century, geometry was highly valued in Polish territories; depending on the period and whether Polish, Prussian, Russian, or Austrian curricula were in place, the focus varied between construction problems, surveying, analytical geometry, and descriptive geometry. It was believed that, alongside its practical applications, one of the main advantages of geometry was its ability to develop logical thinking skills, especially in the context of conducting complex, multi-step geometric constructions.

In the 19th century, secondary schools for boys preparing students for matriculation exams offered comprehensive curricula. Innovations in science were often quickly integrated into these programs. For example, in 1812, elements of descriptive geometry were introduced into schools with Polish curricula based on the works of Gaspard Monge and Jean N. Hachette. This advancement was made possible by a well-educated teaching staff-many secondary school teachers held doctoral degrees. Therefore, to provide a complete picture of mathematics education, this paper also highlights selected teachers, their professional qualifications, and their scientific and educational activities.

During the presentation, examples of 19th-century mathematics problems will be solved. The topics discussed in this paper may serve as material for contemporary teachers to incorporate elements of the history of mathematics education into their lessons.

## References

[1] Barciśki, A. (1833), O rachunkowości kupieckiej, vol. 1: Arytmetyka handlowa, Warszawa.

[2] Dziwiński, P. (1891), Zasady algebry dla wyższych klas gimnazjów i szkół realnych, Lwów.

[3] Ebert, J.J. (1787), Anfangsgründe der nothwendigsten Theile der Mathematik, Leipzig.

[4] Koppe, K. (1852–1871), Anfangsgründe der reinen Mathematik für der Schul- und Selbst-Unterricht, vol. 1: Arithmetik und Algebra (ed. 4), vol. 2: Planimetrie (ed. 4), vol. 3: Stereometrie (ed. 7), vol. 4: Ebene Trigonometrie (ed. 5), Essen.

[5] Karpińska, K. & Domoradzki, S. (2017), O egzaminie maturalnym z matematyki na obszarze

zaboru pruskiego od XVIII do początku XX wieku, Antiquitates Mathematicae vol. 11, pp. 157–201.
[6] Moskwa, R. (1892), O sześciokącie Pascala i sześcioboku Brianchona. In Sprawozdanie Dyrekcyi c.k. Wyższego Gimnazyum Realnego imienia Franciszka Józefa w Drohobyczu, Lwów, pp. 3–42.
[7] Rembacz, M. (1895), Obliczanie planów umarzania pożyczek, spłacanych za pomocą anuitetów. In Sprawozdanie Dyrekcyi c.k. Wyższej Szkoły Realnej w Stanisławowie, Stanisławów, pp. 3–20.
[8] Buchner, F. (1829), Beitrag zur Methode des Unterrichts in der Geometrischen Analysis, Elbing.
[9] Strehlke, F. (1826), Aufgaben über das geradlinigte Dreieck geometrisch und analytisch gelöset, Königsberg.

[10] Luck, F. (1845), Sammlung von 100 geometrischen Aufgaben, nach der Methode der Alten für Schulen bearbeitet, Thorn.



**Karolina Karpińska** is assistant professor in the Institute for the History of Science, Polish Academy of Sciences. In 2017, she received her PhD in the history of mathematics. Her current research is related to the history of mathematics education, with particular attention paid to the Polish territories in the 1795–1918. At that time, Poland was occupied by three empires: Prussia, Austria and Russia, and consequently there were schools with Polish, Prussian, Austrian and Russian curricula and relevant languages of instruction.

She has published several papers in this field, including: "Gnomonics in Secondary School Education in the Territories of Poland in the 17th–20th Centuries", in *Advances in the History of Mathematics Education* (Springer, 2022); "Denominate numbers' in mathematics school textbooks by Stefan Banach", *Historia Mathematica* 59(2022), and "Mathematics teaching at girls? Victoriaschule in Gdańsk from the mid-19th century until World War I", *Journal of Mathematical Behavior* (2025).