Leonhard Euler

Born in Basel, **Leonhard Euler** (1707–1783) spent most of his working life at the scientific academies of St Petersburg and Berlin. Probably the most prolific mathematician of all time, he contributed to almost every branch of mathematics and the physical sciences, including number theory, the calculus, differential equations, mechanics, astronomy, and optics.

Euler reformulated the calculus using the idea of a function. He introduced the notations e ($=2.718\dots$), i ($=\sqrt{-1}$), Σ (summation) and f (for a function), and related the

exponential and trigonometrical functions by means of the **fundamental equation** $e^{i\varphi} = \cos \varphi + i \sin \varphi$, shown on one of the Swiss stamps.

In 1735 he solved the **Königsberg bridges problem**, which asked whether one can cross each of the seven bridges of the city of Königsberg without visiting any bridge twice: the graph depicted on the Korean stamp (issued for the International Congress of Mathematicians in 2014) was not drawn by Euler.

In 1750 Euler discovered his **polyhedron formula** $F + V = E + 2$, relating the numbers of vertices, edges, and faces of a polyhedron; for the icosahedron on the East German stamp, $20 + 12 = 30 + 2$. The now-usual form $V - E + F = 2$ was never written by Euler.

Leonhard Euler

Euler at St Petersburg

Euler's fundamental equation

Polyhedron formula

Polyhedron formula

Königsberg bridges

➤ Column editor's address: **Robin Wilson**, Mathematical Institute,
Andrew Wiles Building, University of Oxford, UK
e-mail: rj.wilson@open.ac.uk