

Leonhard Euler (1707-1783)

Leonhard Euler (pronounced 'oiler') was born in Basel, Switzerland in 1707. His father was a clergyman and he wished that Leonhard would follow his footsteps though he himself had studied mathematics under Jacques Bernoulli and instructed his son in the elements of the subject. The young Euler studied under Jean Bernoulli and was associated with his sons, Daniel and Nicholas. In addition to mathematics he was broadly trained in theology, medicine, astronomy, physics, and oriental languages.

He followed Daniel Bernoulli to the St. Petersburg Academy in 1727 and was initially in the department of medicine! When Daniel Bernoulli left Russia for Basel in 1733 Euler became the Academy's chief mathematician. He married and settled down to pursue in earnest mathematical research and rear a family which ultimately included thirteen children. In 1735 he lost the sight of his right eye, due to overwork, but his misfortune in no way diminished the rate of output of his research. In 1741 Euler joined the Berlin Academy accepting an invitation from Frederick the Great and spent twenty-five years there. Unsophisticated as he was, Euler was not entirely happy at Berlin and the monarch used to refer to him as a "mathematical cyclops". He returned to the St. Petersburg Academy in 1766 and stayed there till the end. He was losing sight in his left eye by cataract and an operation was performed in 1771. Though his sight was restored for a few days, the success was short-lived and he was blind for the last seventeen years of his life. Even this tragedy did not stem the flood of research and publications which continued unabated until 1783 when at the age of seventy-six he suddenly died while sipping tea and enjoying the company of one of his grandchildren.

Euler was by far the most prolific contributor to mathematical literature and averaged about 800 pages a year; he published more than 500 books and papers during his lifetime. He worked in practically every branch of mathematics, pure and applied, and at all levels from the most elementary to the most advanced. He was also the most successful notation builder of all times. He introduced the symbol e (e for exponential) for the base of the natural logarithm and i for $\sqrt{-1}$ and was largely responsible for popularising the symbol π to denote the ratio of the circumference of a circle to its diameter; these three symbols appear together in the equation $e^{i\pi} + 1 = 0$ a general form of which, $\cos \theta + i \sin \theta = e^{i\theta}$, is due to Euler. The notation $f(x)$ for a function of x is also due to him. One finds ubiquitous use of Eulerian symbols and terminology in geometry, algebra, trigonometry, and analysis which is why his name appears frequently in school through college-level mathematics (as well as in *Resonance!*).

Euler won the coveted biennial prize awarded by the Parisian Académie des Sciences twelve times; the essays he submitted to the académie for the contests covered a wide range of topics.

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