Augustin Louis Cauchy

August 21, 1789, in Paris, France
May 23, 1857, in Sceaux, France

Son of Louis-François Cauchy and Marie-Madeleine Desestre, was the oldest of 4 siblings.

Cauchy's father was a high official in the Parisian Police of the Old Régime. He lost his position because of the French Revolution (July 14, 1789) that broke out one month before Augustin-Louis was born. The Cauchy family survived the revolution and the following Reign of Terror (1794) by escaping to Arcueil, where Cauchy received his first education, from his father.

They soon returned to Paris and Cauchy's father was active in the education of young Augustin-Louis. Laplace and Lagrange were visitors at the Cauchy family home and Lagrange in particular seems to have taken an interest in young Cauchy's mathematical education. Lagrange advised Cauchy's father that his son should obtain a good grounding in languages before starting a serious study of mathematics. In 1802 Augustin-Louis entered the École Centrale du Panthéon where he spent two years studying classical languages.
From 1804 Cauchy attended classes in mathematics and he took the entrance examination for the École Polytechnique in 1805. He was examined by Biot and placed second. At the École Polytechnique he attended courses by Lacroix, de Prony and Hachette while his analysis tutor was Ampère. In 1807 he graduated from the École Polytechnique and entered the engineering school École des Ponts et Chaussées. He was an outstanding student and for his practical work he was assigned to the Ourcq Canal project where he worked under Pierre Girard.

In 1810 Cauchy took up his first job in Cherbourg to work on port facilities for Napoleon's English invasion fleet. In addition to his heavy workload Cauchy undertook mathematical researches, and he proved in 1811 that the angles of a convex polyhedron are determined by its faces. He submitted his first paper on this topic then, encouraged by Legendre and Malus, he submitted a further paper on polygons and polyhedra in 1812. Cauchy felt that he had to return to Paris if he was to make an impression with mathematical research.

Over a period of fifteen years, 1815-1830, Cauchy's name grew with distinction as he was appointed adjoint professor and full professor at École Polytechnique, and chairs at the Faculté des Sciences and the Collège de France.

The genius of Cauchy was illustrated in his simple solution of the problem of Apollonius, i.e. to describe a circle touching three given circles, which he discovered in 1805, his generalization of Euler's formula on polyhedra in 1811, and in several other elegant problems.

Cauchy married Aloïse de Bure in 1818, and she was a close relative of a publisher who was to publish most of Cauchy's work and had two daughters.

More important is his memoir on wave propagation, which obtained the Grand Prix of the Institut in 1816. His greatest contributions to mathematical science are embodied in the rigorous methods which he introduced. These are mainly embodied in his three great treatises: *Cours d'analyse de l'École Polytechnique* (1821) was concerned with developing the basic theorems of the calculus as rigorously as possible; *Le Calcul infinitésimal* (1823); *Leçons sur les applications de calcul infinitésimal; La géométrie* (1826–1828); and also in his *Courses of mechanics* (for the École Polytechnique), *Higher algebra* (for the Faculté des
Sciences), and of Mathematical physics (for the Collège de France). He began a study of the calculus of residues in 1826 in Sur un nouveau genre de calcul analogue au calcul infinitésimal while in 1829 in Leçons sur le Calcul Différentiel he defined for the first time a complex function of a complex variable.

Cauchy returned to Paris in 1838. During this period Cauchy's mathematical output was less than in the period before his self-imposed exile. He did important work on differential equations and applications to mathematical physics. He also wrote on mathematical astronomy. The 4 volume text Exercices d'analyse et de physique mathématique published between 1840 and 1847 proved extremely important.

Numerous terms in mathematics bear Cauchy's name: the Cauchy integral theorem, in the theory of complex functions, the Cauchy-Kovalevskaya existence theorem for the solution of partial differential equations, the Cauchy-Riemann equations, the Cauchy distribution in probability, and Cauchy sequences. He produced 789 mathematics papers, an incredible achievement.

His collected works, Oeuvres complètes d'Augustin Cauchy (1882-1970), were published in 27 volumes.

He died unexpectedly at the age of 68, in 23 May 1857.

His last words were addressed to the Archbishop “Men pass away, but their deeds abide”

Cauchy Distribution

The Cauchy distribution is the probability distribution given by the probability density function

$$f(x) = \frac{1}{\pi(1+x^2)}$$

His average is not defined, then it does not have standard deviation. His second cumulant is infinite
Quotations

“Cauchy is mad and there is nothing that can be done about him, although, right now, he is the only who knows how mathematics should be done” – Niels Abel

“As for methods I have sought to give them all the rigour that one requires in geometry, so as never to have recourse to the reasons drawn from the generality of algebra” - Cauchy

Sources


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