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# Joseph Liouville

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*Joseph Liouville* (1809 – 1882) was a French mathematician, editor and author who proved that

$$\sum_{i=1}^{\infty} \frac{1}{10^{i!}}$$

is a transcendental number (that is 0.11000100000000000000... and sometimes called the “basic Liouville number”).

After graduating from the École Polytechnique, Liouville taught at several places before getting a job teaching at his old *alma mater*. He was pen pals with Christian Goldbach and Daniel Bernoulli. Liouville tried to prove that the natural log base  $e$  is transcendental. Though he did not succeed in this, he did prove in 1844 that transcendental numbers exist, and gave the aforementioned Liouville number as an example. This paved the way for other mathematicians to prove the transcendence of  $e$  and other important irrational constants. Liouville also introduced the Liouville function  $\lambda(n) = (-1)^{\Omega(n)}$  (equal in value to the Möbius function  $\mu(n)$  when  $n$  is squarefree).

Liouville wrote many papers as well as edited the writings of Évariste Galois and started the *Journal de Mathématiques Pures et Appliquées* that is still published today. A lunar crater near Dubyago is named after him.