

MATHEMATICS RESEARCH SEMINAR

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THE PROOF OF THE PRIME NUMBER THEOREM

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ABSTRACT: The prime number theorem is one of the celebrated theorems in number theory. It states that the number of prime numbers less than x , denoted by $\pi(x)$, is *asymptotically* equal to $x/\ln x$. Gauss, in a letter of 1849, related that as a boy he had thought much on the problem, and had reached the conclusion that a good approximation to $\pi(x)$ was given by $x/\ln x$. It was first proved by Hadamard and de la Vallée Poussin independently in 1896. In his epoch-making memoir of 1860, Riemann showed that the key to the deeper investigation of the distribution of the primes lies in the study of the Riemann ζ -function as a function of the complex variable s . In this talk, we shall prove the theorem, assuming the results from the theory of $\zeta(s)$. All are invited; especially, students who have completed a complex analysis course are encouraged to attend.