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Grant, Ken

The Riemann zeta zeros from an asymptotic perspective.

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Summary: In 1859, on the occasion of being elected as a corresponding member of the Berlin Academy, Bernard Riemann (1826–1866), a student of Carl Friedrich Gauss (1777–1855), presented a lecture in which he presented a mathematics formula, derived from complex integration, which gave a precise count of the primes on the understanding that one of the terms in the formula, which depended on a knowledge of the non-trivial zeros of the zeta function, could be evaluated. Riemann had calculated some of the non-trivial zeros and found them all to have a real part equal to 0.5. He conjectured that every zero of the zeta function had a real part equal to 0.5. This became known as the “Riemann conjecture” which evolved into the “Riemann hypothesis” as more supporting evidence became available. Riemann’s solution is given using complex number integration and is assessable to university students studying higher mathematics courses. A more assessable solution for school students who are studying advanced mathematics is given in John Derbyshire’s book *Prime Obsession*. The aim of this paper is to show that the zeros of the Riemann zeta function all have the real part equal to one half. This is demonstrated in two ways or methods. Each method shows that there can be only one value for the real part a , and since we know that there are zeros with $a = 1/2$, then the proof is complete. (ERIC)

Classification: F60 I80

Keywords: Riemann zeta function; zeros; Riemann hypothesis