

⑥ Find $\xi(0)$ and $\zeta(0)$

⑦ Find $\zeta(-1)$

⑧ Verify $\zeta(-2n) = 0$, $n = 1, 2, 3, \dots$.
 (The "trivial" zeros.)

⑨ Verify

$$\log \left| \frac{R}{a_1} \cdot \frac{R}{a_2} \cdots \frac{R}{a_n} \right| = \int_0^R n(n) \frac{dn}{n}$$

where $0 < |a_1| \leq |a_2| \leq \dots \leq |a_n| < R$

and $n(n) = \sum_{|a_k| \leq n} 1$ (counting function).

⑩ Show $|(1-w)e^w| \leq 2|w|$ when $|w| \leq 1$. (Actually, the factor 2 can be improved to 1.)

⑪ Determine the constant c in the Taylor expansion

$$(\lambda-1)\zeta(\lambda) = 1 + c(\lambda-1) + c_2(\lambda-1)^2 + \dots$$

$$\zeta(\lambda) = \frac{\lambda(\lambda-1)}{2} \pi^{-s/2} \Gamma\left(\frac{\lambda}{2}\right) \zeta(\lambda)$$