

1116-33-646

Bruce C Berndt* (berndt@illinois.edu). *Some Integrals of S. Ramanujan and S. Chowla.*

In his third notebook, Ramanujan claimed to have proved the identity

$$\int_0^\infty \frac{\cos(nx)}{x^2+1} \log x \, dx + \frac{\pi}{2} \int_0^\infty \frac{\sin(nx)}{x^2+1} \, dx = 0$$

by contour integration. In the new, clearer edition of Ramanujan's notebooks published in 2012, a further result of this type, unintelligible in the first edition, was indicated by Ramanujan. In joint work with Armin Straub, we prove these two identities as well as more general theorems.

In the second part of our lecture, several integrals, mostly containing $\cos x + \cosh x$ in the denominators of the integrands, are examined. Some were considered by Ramanujan, and later also by Chowla. One is the weight function associated with a system of orthogonal polynomials arising in work of M. E. H. Ismail and G. Valent. (Received September 09, 2015)