Berndt, Bruce C.; **Bhargava, S.**; **Garvan, Frank G.**
Ramanujan's theories of elliptic functions to alternative bases. (English) Zbl 0843.33012
Trans. Am. Math. Soc. 347, No. 11, 4163-4244 (1995).

Authors' abstract: In his famous paper on modular equations and approximations to π [Q. J. Math. (Oxford) 45, 350–372 (1914; JFM 45.1249.01)], *S. Ramanujan* offered several series representations of $1/\pi$, which he claims are derived from corresponding theories in which the classical base q is replaced by one of three other bases. The formulas for $1/\pi$ were only recently proved by *J. M. Borwein*and *P. B. Borwein* in 1987 [Pi and the AGM, New York, NY: Wiley (1987; Zbl 0903.11001)], but these corresponding theories have never been heretofore developed. However, on six pages of his notebooks, Ramanujan gives approximately 50 results without proofs in these theories. The purpose of this paper is to prove all of these claims, and several other results are established as well.

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MSC:

33E05 Elliptic functions and integrals
30D10 Representations of entire functions of one complex variable by series and integrals
33C05 Classical hypergeometric functions, ${}_2F_1$
11F27 Theta series; Weil representation; theta correspondences

Full Text: DOI