

Jason I. Brown, Karl Dilcher, and Dante V. Manna
Series Representations of Theta Functions in Terms of a Sequence of Polynomials,
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Abstract

We derive series expansions for the Jacobi theta functions $\theta_j(q)$, $j = 2, 3, 4$, and for $\theta_3(z, q)$, all in terms of a certain sequence of sparse binomial-type polynomials. As consequences we obtain series identities involving second-order recurrence sequences and Chebyshev polynomials of the first kind.