

A new proof of Winkvist's Identity

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In 1969, L. Winkvist gave an elementary proof of Ramanujan's congruence $p(11n+6) \equiv 0 \pmod{11}$, where $p(n)$ is the number of partitions of the positive integer n . An identity later named after him plays a vital role in his proof. We give an elementary proof of this identity in this talk.

We begin with the left side of Winkvist's identity, find all its zeros as a function of two variables, then construct a product of theta functions with the same zeros. By considering functional relations, we show that the quotient of the two functions is an analytic function, then prove the quotient is a constant by taking special values of both functions. This method can also be applied to prove many other interesting theta function identities.