Nihonkai Math. J.
vol. 3 (1992), 125-131

ON THE REPRESENTATIONS OF AN INTEGER AS A SUM OF TWO OR FOUR TRIANGULAR NUMBERS

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ABSTRACT: In this note we show how Ramanujan's ${}_1\Psi_1$-summation formula can be employed to obtain formulas for the number of representations of an integer $N \geq 1$ as a sum of two or four triangular numbers.

1. INTRODUCTION

The representations of an integer N as a sum of k squares is one of the most beautiful problem in the theory of numbers. The study of representations of an integer as sums of squares is treated in depth in the book of E. Grosswald [4] and are useful in lattice point problems, crystallography and certain problems in mechanics. q-hypergeometric functions have played an important role in the theory of representations of the numbers as sums of squares. For instance Jacobi's two and four square theorems have been proved by S. Bhargava and Chandrashekar Adiga [2] on using the following "${}_1\Psi_1$ summation formula" of Ramanujan [9]: