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ON TWO INTERESTING SOMOS'S THETA FUNCTION IDENTITIES OF LEVEL 14

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Abstract: Michael Somos has discovered around 6300 theta function identities using computer and runs PARI/GP scripts. In this paper, we give a proof of two Somos's interesting and elegant theta function identities of level 14 and also we derive two *P*-*Q* theta function identities of level 14 due to Ramanujan.

Keywords and Phrases: Theta functions, Dedekind eta-function.

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1. Introduction

Throughout the paper, we assume $|q| < 1$ and for each positive integer n, we use the standard notation

$$(a;q)_n := \prod_{k=0}^{n-1} \left(1 - aq^k\right) \qquad \text{and} \qquad (a;q)_\infty := \prod_{n=0}^{\infty} \left(1 - aq^n\right).$$

Ramanujan's theta functions are defined by

$$\varphi(q) \;:=\; \sum_{n=-\infty}^{\infty} q^{n^2} = (-q;q^2)_\infty^2 (q^2;q^2)_\infty,$$