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On Certain Results Involving Mock- Theta Functions

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Abstract: In this paper, making use of certain identities, we have established interesting results involving mock-theta functions, partial mock theta functions and complete mock theta functions.
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1. Notations and definitions:

Throughout this note, we shall adopt the following definitions and notations. The q- factorial is defined by,

$$[a;q]_0 = 1$$

$$[a;q]_n = (1-a)(1-aq)...(1-aq^{n-1}), \quad n = 1,2,3,...,$$

and

$$[a;q]_\infty = \prod_{k=0}^{\infty}(1-aq^k).$$

For product of q- shifted factorials, we use the short notation

$$[a_1,a_2,a_3,...,a_r;q]_n = [a_1;q]_n[a_2;q]_n[a_3;q]_n...[a_r;q]_n,$$

where n is an integer or infinity.
Basic and bilateral basic hypergeometric series are defined by,

$${}_r\Phi_s\left[\begin{array}{l} a_1,a_2,...,a_r;q;z \\ b_1,b_2,...,b_s \end{array}\right] = \sum_{n=0}^{\infty}\frac{[a_1,a_2,...,a_r;q]_n z^n}{[q,b_1,b_2,...,b_s;q]_n}\left[(-)^n q^{n(n-1)/2}\right]^{1+s-r}.$$

and

$${}_r\Psi_s\left[\begin{array}{l} a_1,a_2,...,a_r;q;z \\ b_1,b_2,...,b_s \end{array}\right] = \sum_{n=-\infty}^{\infty}\frac{[a_1,a_2,...,a_r;q]_n z^n}{[b_1,b_2,...,b_s;q]_n}\left[(-)^n q^{n(n-1)/2}\right]^{s-r}.$$

respectively. We shall use the following known partial sums in our analysis.

$${}_2\Phi_1\left[\begin{array}{l} a,y;q;q \\ ayz \end{array}\right]_N = \sum_{r=0}^{N}\frac{[a,y;q]_r q^r}{[q,ayq;q]_r} = \frac{[aq,yq;q]_N}{[q,ayq;q]_N}. \quad (1.1)$$