A q-analogue for Euler's $\zeta(6) = \pi^6/945$

11.15

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Abstract: Recently, Z.-W. Sun obtained q-analogues of Euler's formula for $\zeta(2)$ and $\zeta(4)$. Sun's formula were based on identities satisfied by triangular numbers and properties of Euler's q-Gamma function. In this talk, we discuss a q-analogue of $\zeta(6) = \pi^6/945$. Indeed, we have been able to obtain q-analogues of Euler's formula for $\zeta(2k)$, $k = 4, 5, \ldots$ (the general case). However, it is to be noted here that the case $k = 3$ or the q-analogue of $\zeta(6)$ is striking as it leads to very interesting connections. Also, the q-analogue of $\zeta(6)$ is the first non-trivial case where we see the occurence of a certain "extra" term which goes to zero as $q \to 1$ from inside the unit disk. We will also shed some light on this extra term.