In combinatorial representation theory, Kostant’s partition function counts the number of ways a given weight (vector) of a Lie algebra $g$ can be written as a nonnegative integral linear combination of the positive roots of $g$. Although it is very difficult to give a general closed formula for this vector partition function for Lie algebras of arbitrary rank, we are motivated by previous successes in low rank cases and present a closed formula of Kostant’s partition function for the exceptional Lie algebra $g_2$. We then use this result to present a new closed formula for the $q$-multiplicity formula in this Lie algebra. (Received September 12, 2019)