1056-05-1863 **Tong Zhu*** (tongzhu@sas.upenn.edu), 209 South 33rd Street, Department of Mathematics, Philadelphia, PA 19104. *A probability method to prove combinatorial identities.*

A novel and extremely simple probability method is provided to prove combinatorial identities. It has only one step of proof after proper probability setup. This method applies summations of random variables and the density function of the summation. The inherent relations between the probability structure and the combinatorial identities are also discussed, as well as some future development and open problems on this method. I proved three classes of combinatorial identities. The first class is a group of combinatorial identities involving symmetric functions. The second class contains convolution of two sequences. And the third result gives an identity involving multinomial convolution. A special case provides a new way to prove a basic formula concerning the Stirling numbers of the second kind. (Received September 23, 2009)