

Jonathan J. Azose and Arthur T. Benjamin  
*A Tiling Interpretation of the  $q$ -Binomial Coefficients*,  
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**Abstract**

We provide a combinatorial interpretation of the  $q$ -binomial and  $q$ -multinomial coefficients as counting weighted collections of tiled boards. Using this interpretation, we prove a new  $q$ -analogue to Lucas' Theorem and new  $q$ -analogues to identities on the sums of integer squares and cubes. Further proofs of known  $q$ -identities illustrate the use of proof elements including generating functions, recurrence relations, and sign-reversing involutions, all in the  $q$ -binomial context.