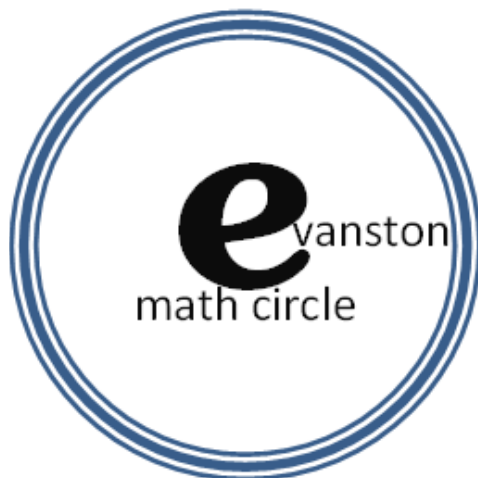


## Fun with Catalan

Take a 4 x 4 grid and count the number of paths which start at the lower left corner and end at the upper right corner, where you are only allowed to move either up or to the right at each step and are not allowed to go above the main diagonal of the grid. Next, take 4 open parenthesis, 4 closed parenthesis, and count the number of ways of arranging these so that each closed parenthesis has a matching open parenthesis occurring before it; so,  $((()))$  is allowed but  $()()()$  is not since the second closed parenthesis does not have a matching open one before it. It turns out these two counts give the same number! How can we see that these counting problems and others like it are one and the same? Come join us at the

## EVANSTON MATH CIRCLE Saturday, December 10



**Northwestern University  
Lunt Hall Room 218, 11:00 AM to 12:30pm**

Math Circle is geared towards middle-school and beginning high-school students, but students of other ages and backgrounds are welcome as well. More information is available at <http://math.northwestern.edu/~scanez/mathcircle/>