UW Math Circle
March 9th, 2017
Homework

1. How many regions do n straight lines divide the plane into, when none of the lines are parallel and no three lines meet at one point?

2. Show that $1^3 + 2^3 + \cdots + n^3 = (1 + 2 + \cdots + n)^2$. Do this with induction, and see if you can find a more geometric proof. By a geometric proof, we mean some picture explaining why this is true.

3. Show that $F_1^2 + F_2^2 + \cdots + F_n^2 = F_n \cdot F_{n+1}$. Here F_n is the nth Fibonacci number. Do this with induction, and see if you can also find a geometric proof.