The Lecture Title

Scribe: Your Name

Date: Day, Mon, Date Year

1 Counting Problems

Problem 1. Consider an equilateral triangle with side length n divided up into unit triangles. How many parallelograms can be drawn along the sides of the triangle?

Solution $3\binom{n+2}{4}$.   ∎

Problem 2. n mathematicians walk into a bar. They each remove their hat and toss it into a pile as they arrive. Several hours later, they leave one by one, grabbing a hat at random to face the brutal March wind. What is the probability that no mathematician received his or her own hat?

Solution   This asymptotically approaches $\frac{1}{e}$ as $n \to \infty$.   ∎

Problem Y. ou have a bag containing x numbered marbles. You draw n marbles with replacement. What is the probability that you saw exactly k distinct marbles?

Solution $\frac{\binom{x}{k}k!\left\{{n \atop k}\right\}}{x^n}$ ∎