

Discrete Mathematics

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Name:

1 Assignment - 9

Due: Thursday Nov. 24

2 Counting

1. An integer is squarefree if it is not divisible by k^2 for any $k \geq 2$. Find the number of squarefree integers less than 1,000,000.
2. Let k be your phone number. What is the 14-permutation number k in the cantor digits enumeration of S_{14} ?
3. What will be this permutation's location in the arrow algorithm?
4. How many different binary strings of length n contain the substring 01 exactly twice.
5. Vua Le decided to mint 25 commemorative gold coins. He needs your help to design a weighing scheme to identify a single fake coin. Please help him.

3 Binomials

1. What are the coefficients of x^{15} , x^{27} in the expansion of $(2x^3 - \frac{1}{2x^2})^{25}$
2. Prove that $\sum_{i=k}^m \binom{i}{k} = \binom{m+1}{k+1}$. Can you find a counting argument?
5. Prove that $\binom{2n}{n} \geq \frac{4^n}{2n}$.