

Homework 2

due Friday April 18, 2014 in class

1. Stanley, Chapter 2.1

- (a) Start with n coins heads up. Choose a coin at random (each equally likely) and turn it over. Do this a total of ℓ times. What is the probability that all coins will have heads up? (Don't solve this from scratch; rather use some previous results!)
- (b) Same as (a), except now compute the probability that all coins have tails up.
- (c) Same as (a), but now we turn over two coins at a time.
Hint: You can use a homework problem from HW 1!

2. Stanley, Chapter 2.6

Let \tilde{C}_n be the graph obtained from the n -cube graph C_n by adding an edge between every vertex v and its antipode (the vertex which differs from v in all n coordinates). Find the number of closed walks in \tilde{C}_n of length ℓ which begin (and hence end) at the origin $\mathbf{0} = (0, 0, \dots, 0)$.

3. Stanley, Chapter 3.2(a)

Let G be a finite graph (allowing loops and multiple edges). Suppose that there is some integer $\ell > 0$ such that the number of walks of length ℓ from any vertex u to any fixed vertex v is independent of u and v . Show that G has the same number k of edges between any two vertices (including k loops at each vertex).