

**Math 219: Homework 2**  
**Due: Friday, February 8th**

- 1) How many rectangles are there on a chessboard? Explain your answer.
- 2) I have eight cubes. Two of them are painted red, two white, two blue, and two yellow, but otherwise they are indistinguishable. I wish to assemble them into one large cube with each color appearing on each face. In how many different ways can I assemble the cube? Explain your answer.
- 3) Consider the number 6. This number has 4 divisors:

$$\{1, 2, 3, 6\}$$

Which numbers have an odd number of divisors? Explain your answer.

- 4) Three men have two jobs each. The chauffeur offended the musician by laughing at his long hair. The musician and the gardener used to fish with John. The painter bought a quart of gin from the consultant. The chauffeur courted the painter's sister. Jack owed the gardener \$5. Joe beat Jack and the painter at Perudo. One of them is a hairdresser and no two have the same job. Who does what? Explain your answer.