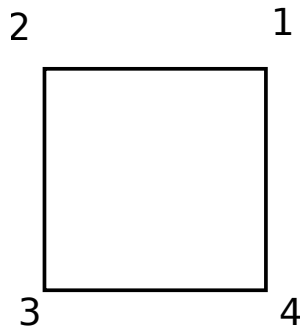
Math 331: Homework Due Sept 9

1. Let G be the group of symmetries of a square with vertices numbered $\{1, 2, 3, 4\}$:



   (a) Catalog all symmetries of the square. For each symmetry, write down where the symmetry sends the vertices $\{1, 2, 3, 4\}$.

   (b) Write down all bijections of the set $\{1, 2, 3, 4\}$. (Remember a bijection is a one to one and onto function from the set $\{1, 2, 3, 4\}$ to the set $\{1, 2, 3, 4\}$).

   (c) For your list in Part 1b, determine which bijections correspond to symmetries of the square and determine which do not. Justify why your bijections that are not symmetries are not symmetries.

2. Catalog all symmetrices of a regular hexagon. Write out a multiplication table for the symmetry group.

3. How many symmetries are there of a regular n-gon. Catalog these symmetries. (Basically, I am asking you to try to understand the generalization of the previous problems.)