Homework 3

due January 30, 2015 for presentation in class

1. Find a subgroup $H \leq S_n$ of the symmetric group and a set of tabloids S such that $\mathbb{C}G/H \cong \mathbb{C}S \cong \mathbb{C}\{1, 2, \ldots, n\}$.

2. Let X be an irreducible matrix representation of G. Show that if $g \in Z_G$ (the center of G), then $X(g) = cI$ for some scalar c.

3. Show that induction is transitive as follows. Suppose we have groups $G \geq H \geq K$ and a matrix representation X of K. Then

$$X \uparrow_K^G \cong \left(X \uparrow_K^H\right) \uparrow_H^G .$$