(1) Let a (finite) group $G$ act on a (finite) set $X$. Let $\pi_X$ be the corresponding representation of $G$ on $F(X)$, and let $\chi_X$ be the corresponding character. Show that for any $g \in G$, $\chi_X(g)$ equals the number of elements of $X$ fixed by $g$.

(2) Show that the character of the regular representation equals $|G|$ at the identity of the group, and equals zero in all other points.

(3) (P) Compute the characters of all irreducible representations of $S_4$. Use the description we gave on lecture 3. Hint: $\chi_{\pi \oplus \tau} = \chi_\pi + \chi_\tau$. 

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