

Exercises discussed on June 7, 2011

- (HW43) Use the Cauchy-Frobenius lemma to determine the number of necklaces with 5 beads in at most 3 colors.
- (HW44) Same as in the previous homework, but now counting bracelets. (Note: here D_5 instead of C_5 is the acting group.)
- (HW45) Let X, Y be finite sets; $X =_G X$; $G \times Y^X \rightarrow Y^X$ the induced Polya action. Show that $(Y^X)_g = (Y^X)_{\bar{g}}$ for all $g \in G$ and that $|(Y^X)_{\bar{g}}| = |Y|^{\text{cn}(\bar{g})}$.
- (HW46) Let $\pi = (1\ 2\ 3\ \dots\ n) \in S_n$ and $\sigma = \pi^k$ for some $k \in [n]$. Show that $\text{ct}(\sigma) = (0, \dots, 0, a_d(\sigma), 0, \dots, 0)$ where $d = n/\text{gcd}(n, k)$ and $a_d(\sigma) = \text{gcd}(n, k)$.