

Day 15 homework - Assigned 2/19 and due on 2/28

Starred problems below are extra-credit for undergraduates and required for graduate students.

3. Let  $a$  and  $b$  belong to a group. If  $|a| = 24$  and  $|b| = 26$ , and  $\langle a \rangle \cap \langle b \rangle \neq \{e\}$ , prove that  $a^{12} = b^{13}$ .

4. Let  $\alpha = \begin{bmatrix} 1 & 2 & 3 & 4 & 5 \\ 3 & 1 & 5 & 4 & 2 \end{bmatrix}$  and  $\beta = \begin{bmatrix} 1 & 2 & 3 & 4 & 5 \\ 2 & 3 & 4 & 5 & 1 \end{bmatrix}$ .

Compute  $\alpha\beta$ ,  $\beta\alpha$  and  $\alpha^{-1}$  represented in the form  $\begin{bmatrix} 1 & 2 & 3 & 4 & 5 \\ a & b & c & d & e \end{bmatrix}$ .