

Quiz 5 (Solutions); Friday, February 29, 2008

Problem 1. Let $H = \langle (1\ 2\ 3) \rangle \leq S_4$. Determine whether or not H is normal in S_4 . Justify your answer.

Solution.

We have $H = \{1, (1\ 2\ 3), (3\ 2\ 1)\}$.

Take $g = (1\ 4) \in S_4$ and $h = (1\ 2\ 3) \in H$.

Then

$$ghg^{-1} = (1\ 4)(1\ 2\ 3)(1\ 4) = (2\ 3\ 4) \notin H.$$

Thus for $g = (1\ 4)$ we have $gHg^{-1} \not\subseteq H$ and therefore H is not normal in S_4 .