Quin Buob   Ok to post

HW 16

1a) $\left\{ \begin{pmatrix}1&2&3&4\\1&2&3&4\end{pmatrix}, \begin{pmatrix}1&2&3&4\\1&3&4&2\end{pmatrix}, \begin{pmatrix}1&2&3&4\\2&1&4&3\end{pmatrix}, \begin{pmatrix}1&2&3&4\\4&2&1&3\end{pmatrix} \begin{pmatrix}1&2&3&4\\4&3&2&1\end{pmatrix} \begin{pmatrix}1&2&3&4\\1&4&2&3\end{pmatrix} \right.$

$\left. \begin{pmatrix}1&2&3&4\\2&3&1&4\end{pmatrix}, \begin{pmatrix}1&2&3&4\\3&1&2&4\end{pmatrix} \right\}$

~~A_4 has 6 members~~ A_4 has 8 members

By lagrange's thm we know that a subgroup of the Symetric group and the symetric groups members must be an Integer

$$\frac{24}{8} = 3$$

1b) H contains the identity element $\{(1234)\}$

$$H = \{[1234], \overset{h_1}{[2314]}\ \overset{h_2}{[3124]}\}$$

$h_1 * h_2 = [1\ 2\ 3\ 4]$ so every member of H has an inverse and any 2 members of h multiplied together are also in h

1c) I don't know

1d) $|H| = 3 \quad |G| = 24$

$$\frac{|G|}{|H|} = \frac{24}{3} = 8$$

2) If H is a subgroup of G then $|G| = n|H|$ where n is an integer and there exists $g_1 \cdots g_n$ st. $G = Hr_1 \cup \dots \cup Hr_n$

Suppose r_1 exists in G and $|Hr_n| = |H|$. If $Hr_1 \neq G$ then you can take an r_2 which exists in G/Hr_2 from LEMMA we know $Hr_1 \neq Hr_2$ so $|Hr_1 \cup Hr_2| = 2|H|$. We continue this n times we get

$$|G| = |Hr_1 \cup Hr_2 \cup \dots \cup Hr_n| = n|H|$$