HW 16

Ok to post

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

A^4 has 2 subgroups. For any members a & b either $a*H = b*H$ has nothing in common with $b*H$

b) H contains the identity element and we see that $(A^4)^2$ gets us back to the A^2. And $A^2 * A^4$ gets us the identity permutation

c) Confused

d) We explictly construct left-coset decomposition of A^4 into cosets of H, each having the same number of elements. And one of them overlapping.

2) Suppose that $a*H$ has a common member with $b*H$. There exists h1 in H and h2 in H such that $a*h1 = b*h2$. Now multiply from the right by $h2^{(-1)}$

$h1 * h2^{(-1)} = a^{(-1)} * b$

Hence $a^{(-1)} * b$ belongs to H hence a belongs to the coset $b*H$

Hence $a*H = b*H$ $\boxed{|G| / |H| \text{ is an int}}$