MAS 4301 – Cosets

Let $G = S_3$ be the symmetric group and let $H =< (1\ 2) >$ and $K =< (1\ 2\ 3) >$.

1. How many left cosets of H are there?

2. I want you to find all of the left cosets of H and list their elements. Here is the algorithm.
   (a) Write out the elements in H (as a set).

   (b) Pick an element in $g \in G \setminus H$. Operate all of your elements in H by g to form a new coset gH. List the elements in gH(as a set).

   (c) Pick an element that doesn't belong in either of these cosets, say $g_2 \in G$ and operate H by g_2 and list the elements in g_2H (as a set).

   (d) Continue until you have exhausted all of the elements of G. List the left cosets of H and their elements.

3. List the right cosets of H.

4. List the left and right cosets of K.