Take Home Midterm Section

This section is to be taken home, completed, and turned in through Canvas by 8:00pm Friday Feb 6th. There is no time limit and you do not need to type up your solutions to get full marks although the answers should be well edited and readable.

You may discuss this problem with anyone else from the class and use the class resources posted on Canvas. Make sure to cite any resources you use as a professional courtesy.

Consider the subgroup H in S_8 with the two generators a and b defined below in cyclic notation and 'one-line' notation:

$a = (1234)(5876) = [2, 3, 4, 1, 8, 5, 6, 7]$

$b = (1537)(2648) = [5, 6, 7, 8, 3, 4, 1, 2]$

1. [2] Is H abelian? Provide justification.
2. [3] Provide a cycle graph for the subgroup H so the orbits of the elements can easily be seen.
3. [3] Create the subgroup lattice for H.
4. [2] Identify what group in the textbook the subgroup H has the same structure of. Provide some justification (but not a formal proof since "isomorphic" hasn't been defined yet!)