Kinetics Worksheet 2

1. What is a reaction mechanism? An intermediate?

2. The gas-phase reaction $2HBr + NO_2 \rightarrow H_2O + NO + Br_2$ is thought to occur by the following mechanism

$HBr + NO_2 \rightarrow HOBr + NO$ $\quad \Delta H = 4.2$ kJ (slow)
$HBr + HOBr \rightarrow H_2O + Br_2$ $\quad \Delta H = -86.2$ kJ (fast)

   a. Draw the energy diagram that depicts this reaction mechanism. On the diagram, show the energy of the reactants, energy of the products, and relative activation energies of the two elementary steps.

   b. Are there any intermediates in the complex reaction described above? Explain why or why not. If any intermediates exist, what are their formulas?

3. It is believed that the following two elementary steps make up the mechanism for the reaction between nitrogen monoxide and chlorine:

$NO(g) + Cl_2(g) \rightarrow NOCl_2(g)$
$NOCl_2(g) + NO(g) \rightarrow 2NOCl(g)$

   Write the equation for the overall reaction and identify any intermediates in the reaction mechanism.