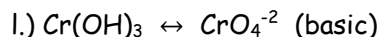
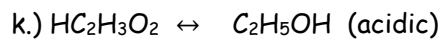
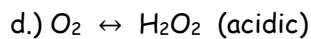
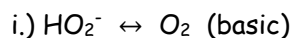
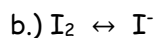
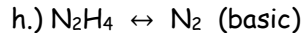
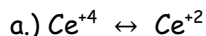


## Worksheet - Balancing Redox

1.) Balance the half-reactions below.



2.) Use the following half-reaction for the following questions:  $MnO_4^- \leftrightarrow MnO_2$

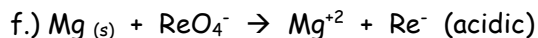
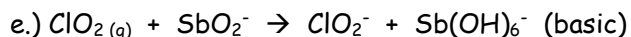
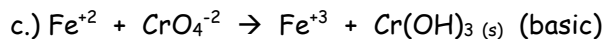
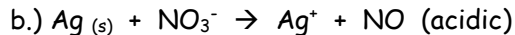
a.) What are the oxidation numbers for the Mn on both side?

b.) Calculate the  $\Delta ON$  (**change in Oxidation Number**) including the charge.

c.) Balance the half-reaction in acidic solution.

d.) Look at how the electron amounts change from reactants to products. Is this a reduction or oxidation reaction?

3.) Balance the following equations using the half-reaction method.



4.) Now balance the same equations using the oxidation number method.

