Pre-lab 6 Help

How to determine oxidation numbers

When we assign oxidation numbers to the atoms in a molecule, we are treating every compound as though it is an ionic salt (even when we know it is not), and are determining the charge on each "ion" in the compound. Each atom gets its own oxidation number. We assign these charges based on a few simple rules. The only rules you need to know to do these pre-lab problems are:

- The oxidation states of all the atoms in a neutral molecule add up to 0. The oxidation states of all the atoms in an ion (such as NO_3^- or SO_4^{2-}) add up to the charge on the ion.
- Group I metals (Li^+, Na^+, K^+, etc) are almost always +1 in compounds.
- Oxygen is almost always –2 in compounds.

Pre-lab 5 a) $Cr_2O_7^{2-}$ If the seven oxygens are each -2, that adds up to -14 total. The overall charge on the ion is -2, so the two chromiums must add up to +12. So each chromium is...?

Pre-lab 5b) Cr_2O_3 This problem is done just like the last one.

Pre-lab 5c) Add the charges on the oxygens and on the potassiums. The overall charge is zero, so what is the oxidation number of the chromium?

Pre-lab 5d) You know that an H_2O molecule is neutral, so you can just label them zero and forget about them. You also know that a nitrate ion is -1, so you can just add those up. What does that make the chromium?

Oxidation states are not real charges, and they can even be fractions sometimes. Oxidation numbers are really just a simply way of keeping track of electrons in redox processes, where electrons move from one compound to another.

For more detail on assigning oxidation numbers, see Zumdahl pages 116 and 118-119.