Some Rules for Assigning Oxidation Numbers

rule	examples
1. Neutral substance that contains atoms of only one element = 0	H_2, Na, Cl_2
2. Monatomic ions = charge on the ion	Fe^{2+}, Zn^{2+}, Br^-
3. Fluorine always = -1	NaF, ClF_3
4. Group IA elements (except H) always = +1	NaCl, KCl
5. Group IIA elements always = +2	$MgCl_2$, $CaSO_4$
6. Group VIIA elements often = -1	BCl_3, NaI
7. Oxygen usually = -2, except in:	H_2O
a. peroxides (contain the O_2^{2-} group) = -1	H_2O_2
b. superoxides (contain the O_2^- group) = -1/2	KO_2
8. Hydrogen can be either +1 or –1:	
a. when bonded to a metal = -1	NaH
b. when bonded to a nonmetal = +1	HCl
9. Sum of oxidation numbers of atoms in molecule = charge on molecule	

Hints:

- First, identify the atoms that *always* have a particular oxidation number.
- Use rule 9 to calculate the oxidation numbers for atoms which are not described by this set of rules.
- Oxidation numbers are usually written with the sign followed by the magnitude – this is opposite to the way charges on ions are written (magnitude followed by sign).