Rules for Assigning Oxidation Numbers

1. In free elements, each atom has an oxidation number of zero.
2. For monatomic ions, the oxidation number is equal to the charge of the ion. All alkali metals have an oxidation number of +1 and all alkaline earth metals have an oxidation number of +2 in their compounds. Aluminum has an oxidation number of +3 in all its compounds.
3. Oxygen usually has an oxidation number of −2 in compounds; in hydrogen peroxide (H_2O_2) and in the peroxide ion (${O_2}^{2-}$), it has −1.
4. Hydrogen usually has an oxidation number of +1, except when bonded to metals in binary compounds, e.g., LiH, NaH, CaH_2, where it has −1.
5. Fluorine has an oxidation number of −1 in all its compounds.
6. In binary compounds with metals, the group 7A elements have an oxidation number of −1; the group 6A elements, −2, and the group 5A elements, −3.
7. The sum of the oxidation numbers of all atoms equals zero for neutral compounds and equals the charge for polyatomic ions.
8. Oxidation numbers are not always integers. For example, the oxidation number of O in the superoxide ion, ${O_2}^{-}$, is −1/2.