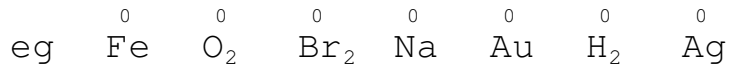
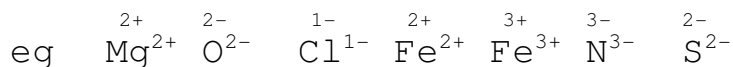


Rules for Determining Oxidation States

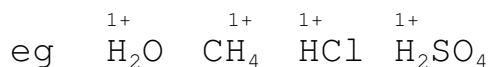
1. Neutral elements have the oxidation state of 0
- not listed on the periodic table



2. Oxidation state of a simple ion is the ionic charge
- simple ion is a one element only ion



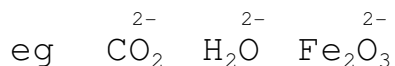
3. Hydrogen in a compound has an oxidation state of 1+



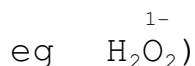
(rare exceptions result in dangerously reactive substances)



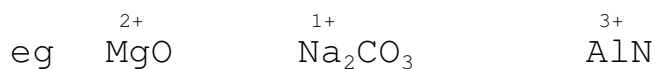
4. Oxidation State of Oxygen in a compound is 2-



(Rare exceptions use oxygen in a 1-



5. Group I, II and III elements follow the octet rule



6. The sum of the oxidation states in a neutral molecule/compound must add up to zero.

x 2^-
 CO_2 therefore the carbon must be:

$$0 = x + 2(2^-)$$

$$x = 4+$$

$4+2^-$
 CO_2

x 2^-
 Fe_2O_3 $0 = 2(x) + 3(2^-)$

$$x = 3+$$

$3+ 2^-$
 Fe_2O_3

x $1+2-1+$
 CH_3OH $0 = x + 4(1+) + 2^-$

$$x = 2^-$$

$2-1+2-1+$
 CH_3OH

7. The sum of the oxidation states for an ion must add to the ionic charge of the ion

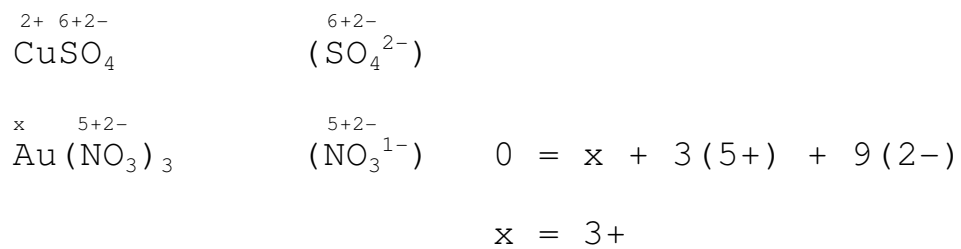
eg x 2^-
 CO_3^{2-} $2^- = x + 3(2^-)$

$$x = 4+$$

eg x 2^-
 NO_3^{1-} $1^- = x + 3(2^-)$

$$x = 5+$$

8. Tough combination example



Complete the following by showing all possible oxidation states:

