

Determining the Oxidation Number



Rules to remember...

Cation-

Anion-

1. The cation is written _____ in a formula, followed by the anion.

For example, in NaH, the H is ____;
in HCl, the H is ____.

Mono-

2. The oxidation number of a monatomic ion _____.

For example, the oxidation number of Na^+ is ____; the oxidation number of N^{3-} is ____.

Rules to remember...

3. The oxidation number of hydrogen is ____ in ____ of its compounds.

Exception: In _____, the oxidation number of hydrogen is ____, as in CaH_2 .

4. The oxidation number of oxygen in compounds is _____.

The oxidation # of most _____ elements is ____.

Oxidation # can be written as ____ or ____

Rules to remember...

5. The oxidation number of a **Group 1 element** in a compound is ____.

Group 1- Alkali Metals

6. The oxidation number of a **Group 2 element** in a compound is ____.

Group 2- Alkali Earth Metals

7. The oxidation number of a **Group 17 element** in a compound is ____, except when that element is combined with one having a higher electronegativity. It is -1 _____.

Group 17- Halogen Gases

Rules to remember...

8. The _____ of the oxidation numbers of all of the atoms in a _____ compound is _____.

_____ = _____, for example

() + () =

9. The _____ of the oxidation numbers in a _____ ion is equal to the _____.

For example, the sum of the oxidation numbers for SO_4^{2-} is

Polyatomic Ion-

The entire ion (SO_4) is -2.

Example 1...

Determine the oxidation number of carbon in $\text{K}_2\text{C}_2\text{O}_4$.

- Na is ____ (Group ____)...but there are ____ of them
so... () () =

Rule #5

- O is ____ (Group ____)...but there are ____ of them
so... () () =

Rule #4

Do the math...add ____ and ____
() + () =

- Refer to rule #____...the sum of the oxidation numbers of all atoms in a neutral compound is zero...so () + ? = 0

Remember =

The oxidation number of carbon = ____

Example 2...

Determine the oxidation number of the metal in Fe_2O_3 .

- O is ___ (Group ___)...but there are ___ of them so... () () =

Rule #4

Refer to rule # ___...the sum of the oxidation numbers of all atoms in a neutral compound is zero...so () + ? = 0

? = _____ BUT there are ___ atoms of Fe, so...

() / 2 =

The oxidation number of Fe is _____.

Remember to include the + symbol if the oxidation # is positive.

Example 3...

Determine the oxidation number of phosphorus in PO_4^{-3} .

PO_4^{-3} is not a neutral compound

Rule #4

- O is ___ (Group ___)...but there are ___ of them so... () () =

- Do the math...

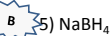
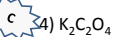
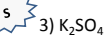
$$(?) + () = -3$$

The oxidation number of P = _____

$$\begin{array}{r} ? \\ + \\ \hline = -3 \end{array}$$

Practice...

Determine the oxidation numbers of the identified ion in each of the following.



Homework

Determining Oxidation Numbers
Due Tomorrow.

#10...keep (NH_4) together as a polyatomic ion with a +1 charge.

HINT

