

Formal Charge:

Used to determine which Lewis structure is the best when there is more than one possibility

Charge that an atom has in a molecule if all the atoms had the same electronegativity (if all bonding electron pairs are shared equally)

Don't represent the real charges on atoms in Lewis structures.

Formal charges in a molecule add to zero and in an ion the sum is the charge on the ion.

To calculate:

Number of valence electrons minus number of electrons assigned to the atom.

low PRS.

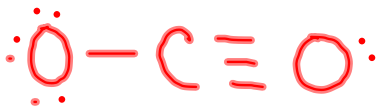
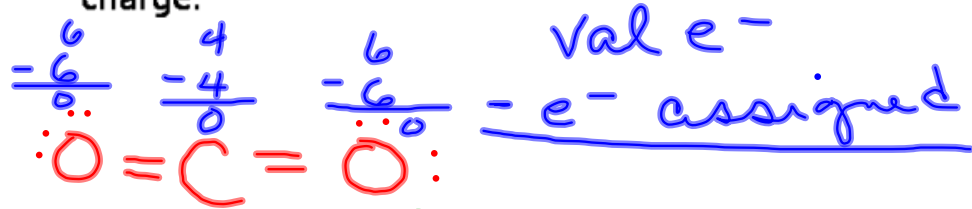
Electrons assigned to the atom include all the nonbonding electrons and half the bonding electrons.

General rule:

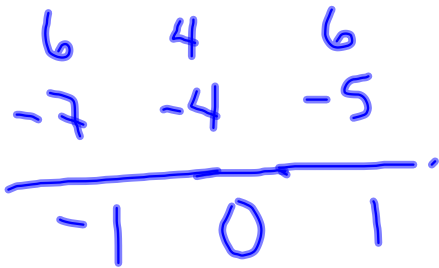
When several Lewis structures are possible, the most stable one will be the one in which the atoms have formal charges closest to zero and any negative charges reside on the more electronegative atoms.

Draw

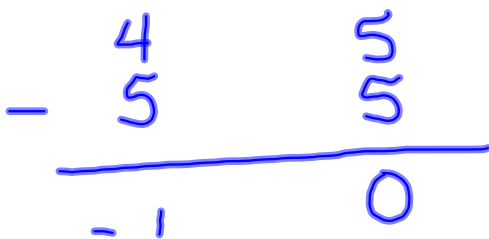
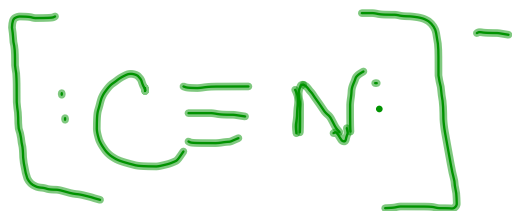
~~Lewis~~ the Lewis Structure for CO_2 and CN^- determine the formal charge.



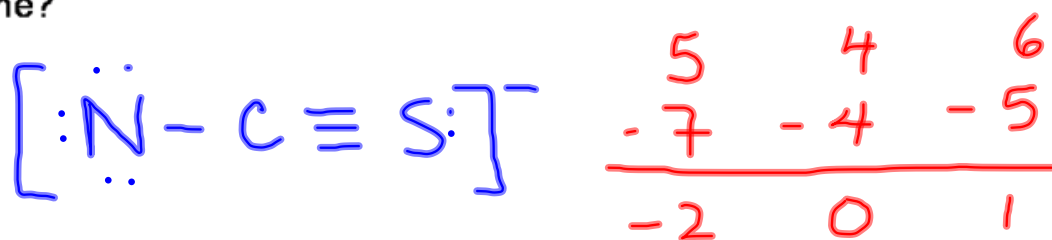
→ Better structure



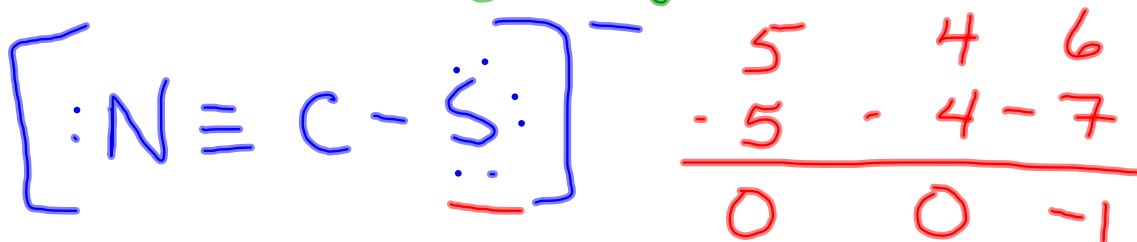
$$4 + 5 + 1 = 10$$



Draw 3 Lewis structures for NCS^- and determine the formal charge of the atoms in each structure. Which structure is the preferred one?

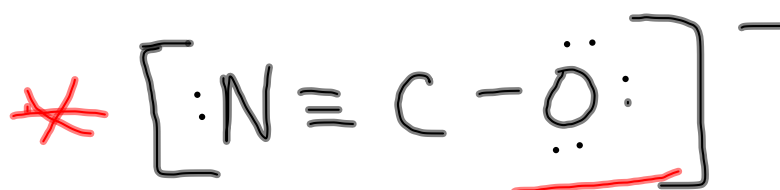
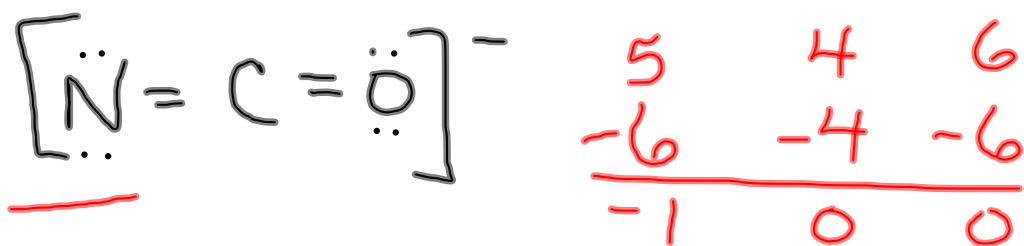
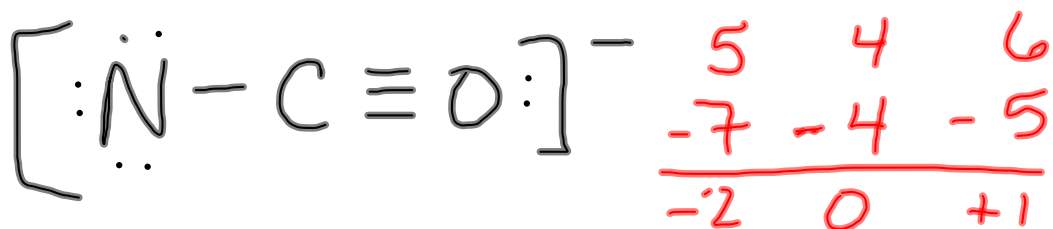


most S^- needs charge



increase
 \longrightarrow
 ↓ decrease

There are 3 possible Lewis structures for NCO^- . Draw the structures and determine which structure is the more stable.



$$\begin{array}{r} 5 \quad 4 \quad 6 \\ -5 \quad -4 \quad -7 \\ \hline 0 \quad 0 \quad -1 \end{array}$$