1. Does the following molecule, C₃H₄, have all of its atoms in the same plane? 
   (note: it can be drawn two ways—is the answer different depending?)

2. For the following, give the hybridization on each atom, and the number of sigma and pi bonds:
   
a. PF₅

b.

![Image of molecule with hybridization]

c.
3. Draw the different types of molecular orbitals.

4. Draw the MO diagrams, determine the number of unpaired electrons and the bond order for the following:

\[
\begin{align*}
&H_2 & B_2^- & O_2 & NO^+ \\
\end{align*}
\]

5. Put the above in order of bond length.

6. For which of the molecules or ions in #4 would the bond strength increase if an electron was removed?