2. (15 points total) For each of the following species, do the following:
   (i) Draw the Lewis structure. Include multiple resonance structures if they are required by the symmetry of the species.
   (ii) Write down the coordination number and steric number for the central atom of each structure, and then name the shape of the molecule.
   (iii) Draw the stereoechemical formula.
   (iv) Write down the ideal bond angles (e.g. ideal: $\theta$(H-O-H) = 109.5°).
   (v) Writing an inequality, note any expected deviations from ideal bond angles (e.g. reality: $\theta$(H-O-H) < 109.5°). (If you do not expect any deviations, note that as well.) You need not justify your answers.

(a) AsF$_3$; (b) PCl$_4^+$; (c) SF$_2$.

(a) AsF$_3$ : 13 pairs
\[ \text{As} \quad \text{CN = 3} \]
\[ \text{SN = 4} \]
\[ \text{F} \quad \text{trigonal pyramidal} \]

(b) PCl$_4^+$ : 16 pairs
\[ \text{Cl} \quad \text{CN = 4} \]
\[ \text{SN = 4} \]
\[ \text{Cl} \quad \text{tetrahedral} \]
\[ \text{P} \quad \text{ideal} \]
\[ \text{Cl} \quad \text{no deviation from ideality!} \]

(c) SF$_2$ : 10 pairs
\[ \text{F} \quad \text{ideal: } \theta$(F-S-F) = 109.5° \]
\[ \text{S} \quad \text{reality: } \theta$(F-S-F) < 109.5° \]
\[ \text{F} \quad \text{bent} \]

Note: Putting F in the middle leads to an quite undesirable Lewis structure:
\[ \text{F} \quad \text{with + on the most electronegative atom, F!} \]