Problem Set #4

Question 1. Label each of the following molecules as chiral or achiral. For each achiral compound, describe why it is achiral (internal mirror plane, no stereocenters, etc.).

a. CHFBrCl

b. CHF_2Br

c. 2-methylheptane

d. 3-methylheptane

e. 4-methylheptane

f. *cis*-2-butene

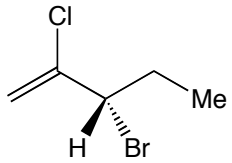
g. *trans*-2-butene

h. *cis*-1,2-dimethylcyclobutane

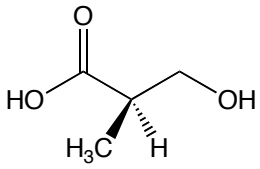
i. *trans*-1,2-dimethylcyclobutane

Question 2. Assign the stereochemistry (*R* or *S*) for each stereocenter in the following molecules.

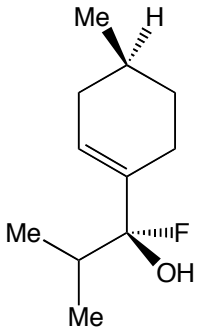
a)



b)

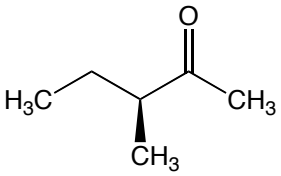


c)

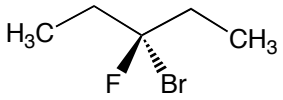


Question 3. Determine whether the following molecules are chiral. For each chiral compound, draw the enantiomer. For each achiral compound, explain why it is achiral (internal mirror plane, no stereocenters, etc.).

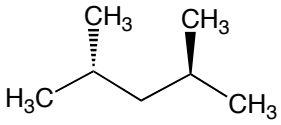
a)



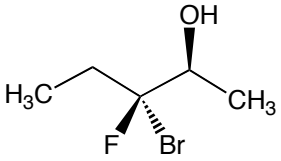
b)



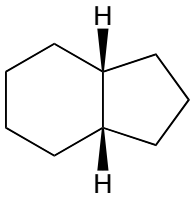
c)



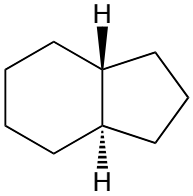
d)



e)



f)



Question 4. The following compound is a bit of an oddity. Is it chiral or achiral? How many stereocenters does it contain? Does it have an internal mirror plane? Does this change our "rules" for chirality at all? *Note: this is hard! Try testing its chirality and see what happens*.