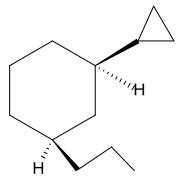
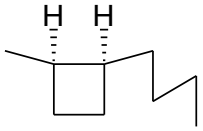
CHM 2210 - Homework for Chapter 4

1. Name the following molecular skeleton structures, and include their cis/trans stereochemistry. Follow naming rules in Sections 3.4, 4.1, and 4.2. (2 pts)





2. Provide skeleton structures for trans-1,3-diisopropylcyclohexane and trans-1-methyl-3-(2-methylpropyl)cyclopentane. (2 pts)

3. The cis-1,2-dimethylcyclobutane molecule has a trans stereoisomer.
   Also, they have three constitutional isomers that are dimethylcyclobutanes as well.
   Draw the cis and trans molecules, and one of the three constitutional isomers.
   Use dashes and wedges to indicate geometry for all three molecules, as in Example 4-1.
   Also, name your constitutional isomer, including its cis/trans stereochemistry. (2 pts)

4. If cyclopentane was a planar molecule it would have almost no angle strain.
   Make a drawing of it with a completely flat ring. Determine the total number of H/H eclipses and the total torsional strain that they would cause if the molecule was flat.
   Cyclopentane's actual total strain is 26 kJ/mol because it is not flat.
   Use Figure 4.6 to draw a more accurate diagram. Explain what happened to the shape of the nonplanar molecule and how it affects the total strain in terms of its torsional and angle strains. (2 pts)

5. Review Table 4.1, as well as Figures 4.15 & 4.16, for information on strains and conformations.
   Draw both chair conformers for both the cis and trans stereoisomers of 1,2-diethylcyclohexane.
   Label each ethyl substituent as either axial (ax) or equatorial (eq).
   Determine all strain components, and their sum, for each of the four conformers.
   Assume that each ethyl-ethyl gauche and diaxial interaction is at 4.0 kJ/mole. (2 pts)