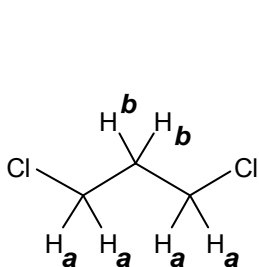
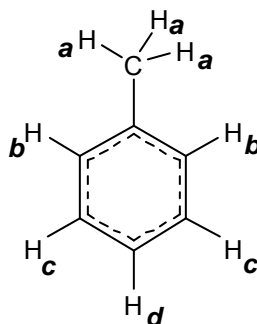


Workshop 22 Solutions  
Equivalent and Inequivalent Nuclei



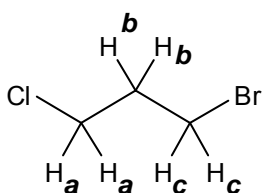
number of resonances

2

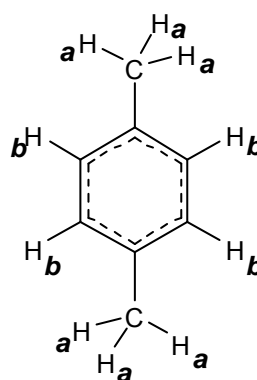


number of resonances

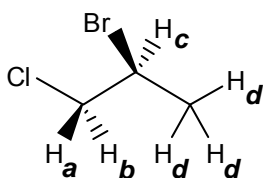
4



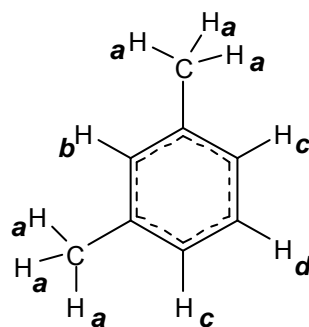
3



2

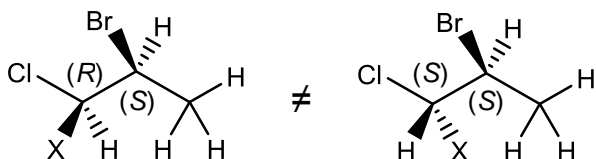


4



4

Why are  $H_a$  and  $H_b$  inequivalent? In class, I described a test used to evaluate whether two protons are inequivalent, in which each is replaced with another atom (say an "X"). If this replacement gives two different molecules, then those two H's are inequivalent. Here, replacing  $H_a$  or  $H_b$  gives diastereomers:



These molecules aren't the same. (I assumed that "X" was priority #1 in the R/S assignment.) So, the two protons are diastereotopic, inequivalent.