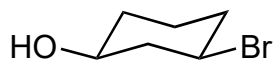
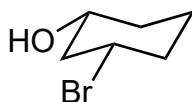


3A) (6 pts) What is the relationship of the following pairs of compounds?

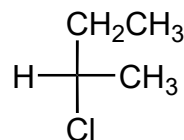
- 1 and 2 \_\_\_\_\_ A) constitutional (structural) isomers B) enantiomers C) diastereomers  
3 and 4 \_\_\_\_\_ D) the same compound E) unrelated



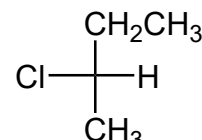
1



2



3



4

3B) (6 pts) For the given compound, indicate whether or not it is chiral, and whether or not it is optically active (will it rotate plane-polarized light?). If this molecule has an enantiomer, draw the enantiomer.

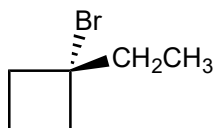
is it chiral? \_\_\_\_\_

*If it has an enantiomer, draw it:*

*YES or NO*  
*for each:*

optically active? \_\_\_\_\_

has an enantiomer? \_\_\_\_\_



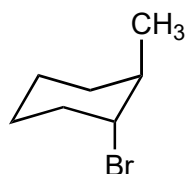
3C) (6 pts) Briefly **explain** the difference in the two  $pK_a$  values given below, and indicate which direction of the equilibrium is favored (**forward**, **reverse** or **neither**).

equil. direction?

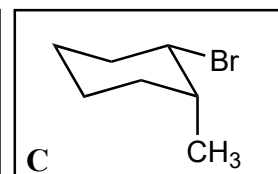
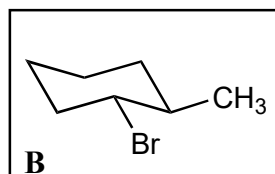
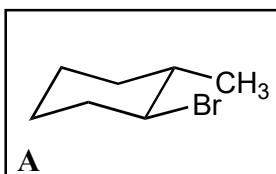


Explain difference  
in  $pK_a$  values:

3D) (6 points) Identify which drawing (A, B or C) represents X, the other chair conformation of the given compound. Which direction (**forward**, **reverse** or **neither**) of equilibrium is favored? **Briefly explain** why.



**X**  
(the other chair  
conformation)



chair flip? X =

Explain equilibrium direction:

equil. direction?