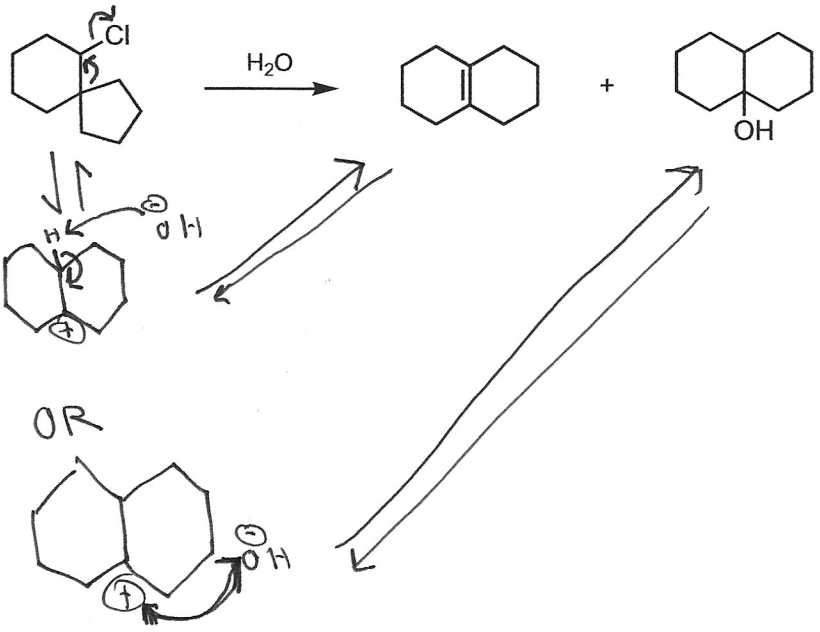
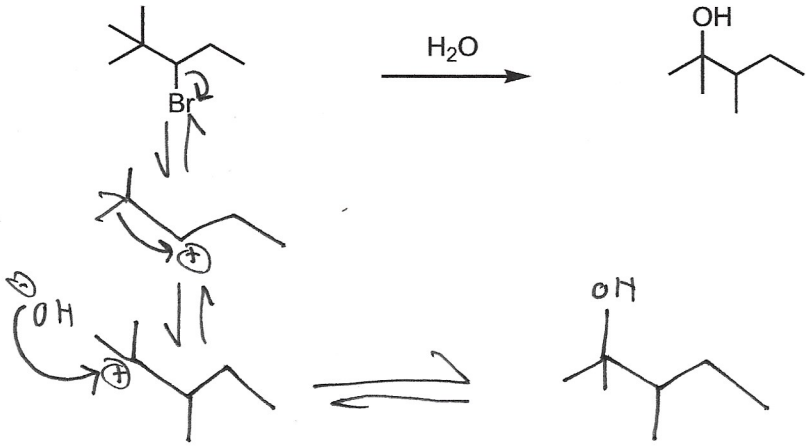
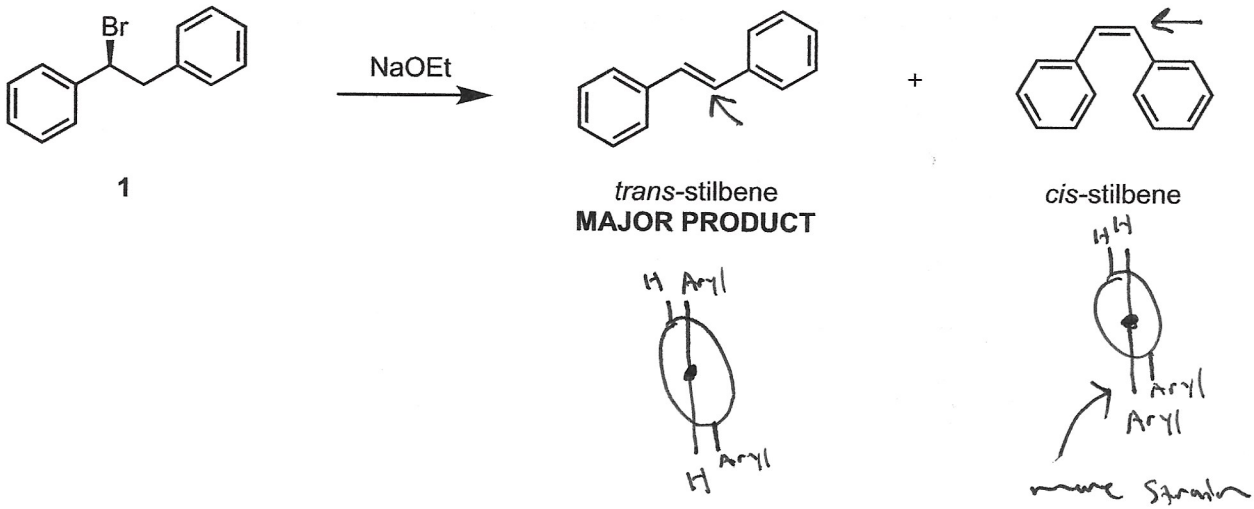
Name: Josh Whitehead ID: v10693443

1. **Mechanisms:** Provide a detailed, stepwise mechanism for the following transformations. Use curved arrows to show the movement of electrons.





2. The (*S*)-enantiomer of alkyl bromide **1** reacts with a strong base to produce *trans*-stilbene and *cis*-stilbene. A) Explain why the *trans* isomer is the major product by providing the Newman projections that lead to the formation of each product and compare their stability.



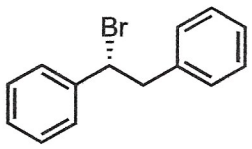
1

trans-stilbene
MAJOR PRODUCT

cis-stilbene

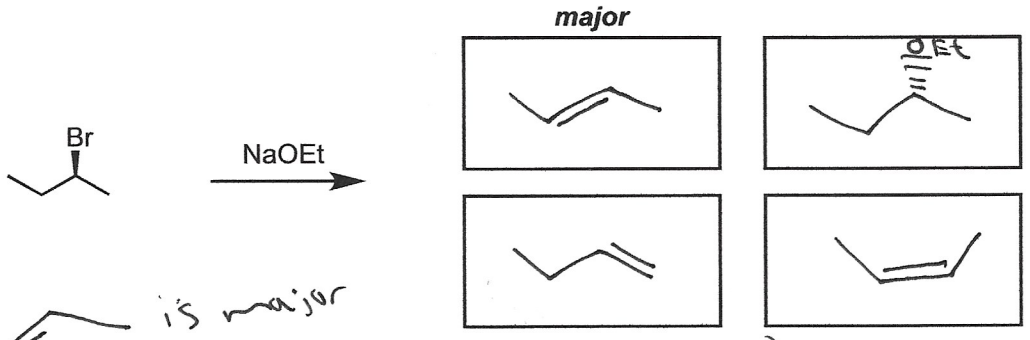
more Strain

B) When the (*R*)-enantiomer of alkyl bromide **1** is used as starting material, the stereochemical outcome does not change. That is, *trans*-stilbene is still the major product. Explain.



Alkyl bromide undergoes an elimination rxn, so whether the Br is in front or back, it still leaves and the same double bond C=C is formed.

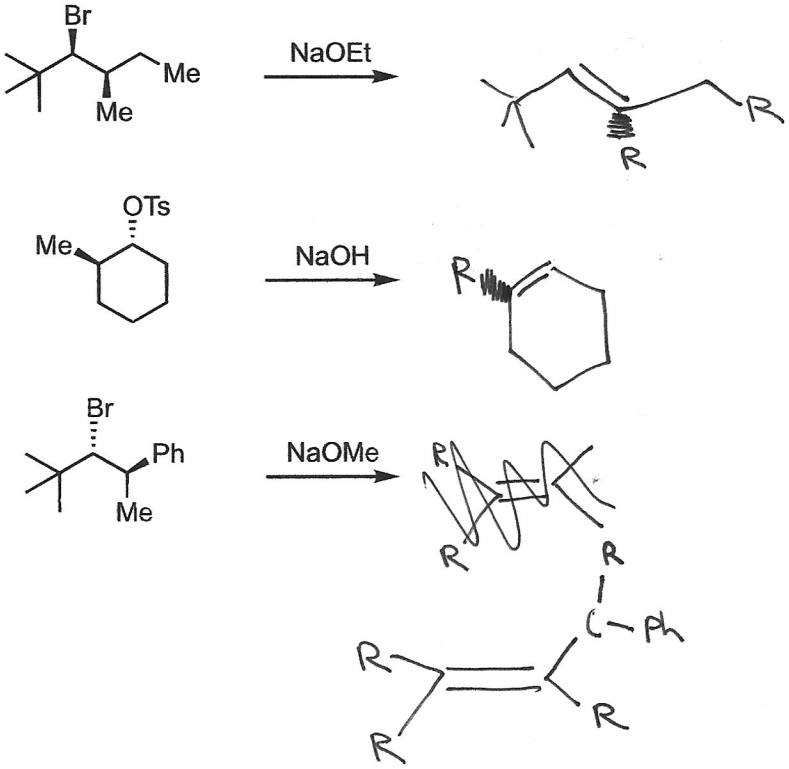
3. When the following alkyl bromide is combined with sodium ethoxide, 4 products are formed (one product is major). Predict the 4 products formed. Which product is major? Why?



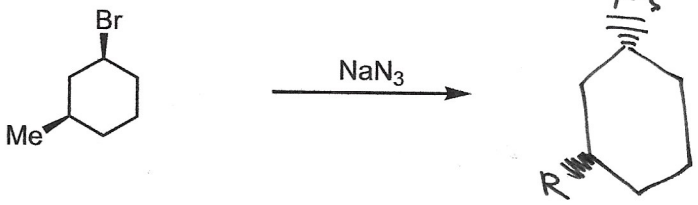
is major

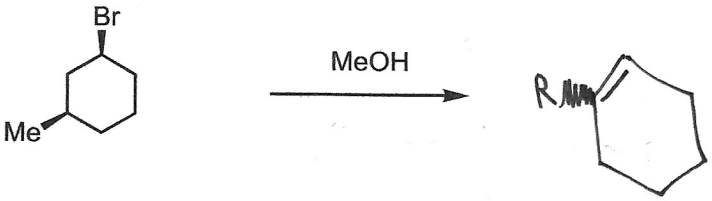
because the pKa of NaOEt is >11 so the elimination reaction is predominant and it is the trans- isomer

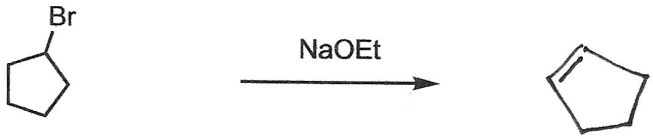
4. Predict the product for the following reactions. Pay special attention to stereochemistry.

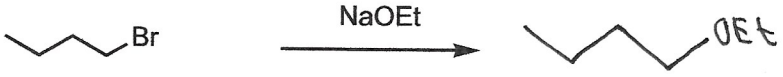


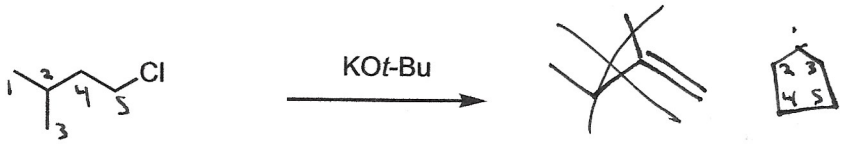
5. Predict the major product for the following reactions.

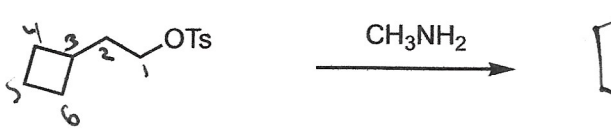


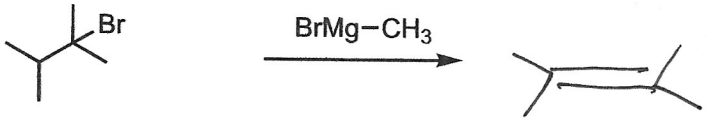




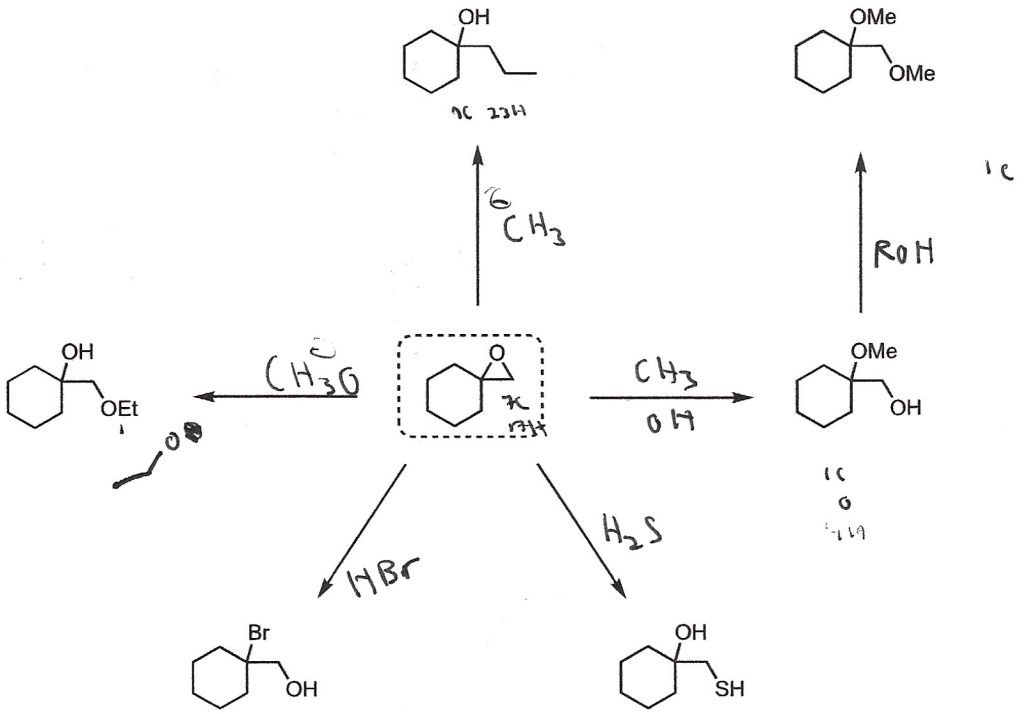




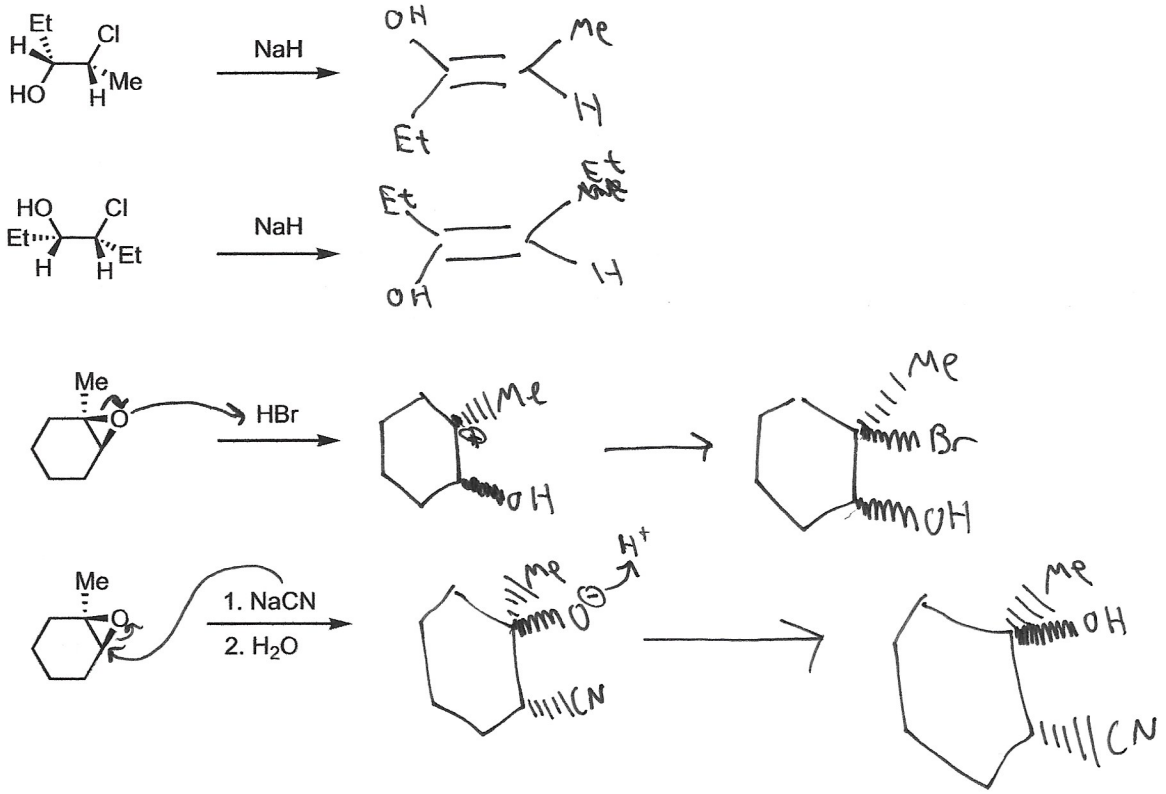




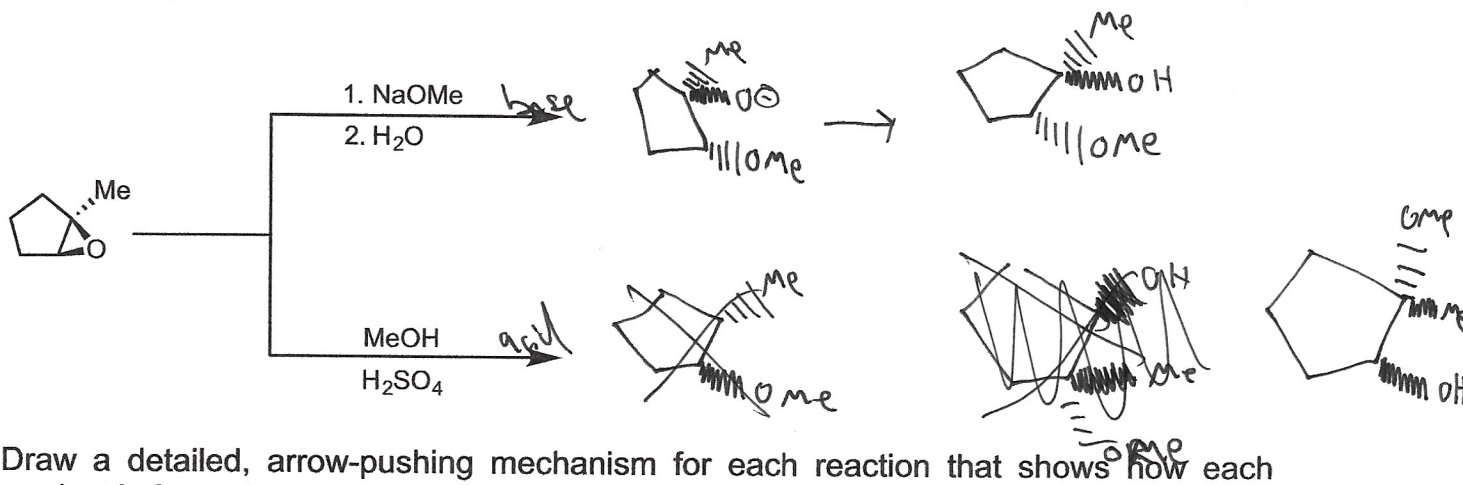
6. Provide the missing reagents.



7. Predict the major product for the following reactions.

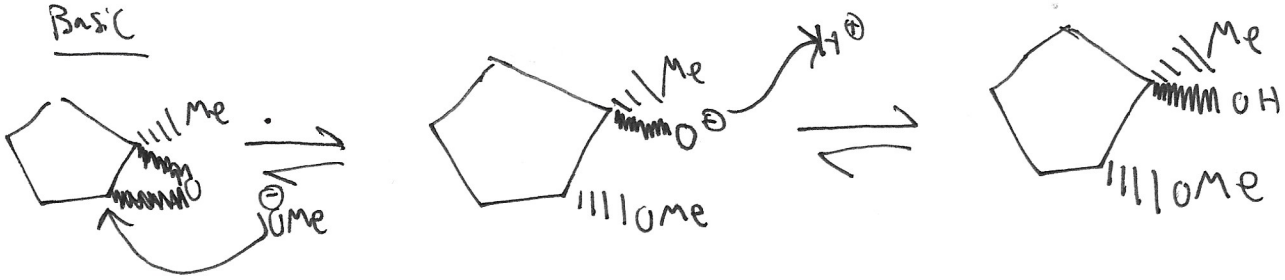


8. The following reactions afford products that are constitutional isomers of one another. Predict the product of each reaction.



Draw a detailed, arrow-pushing mechanism for each reaction that shows how each product is formed.

Basic



Acidic