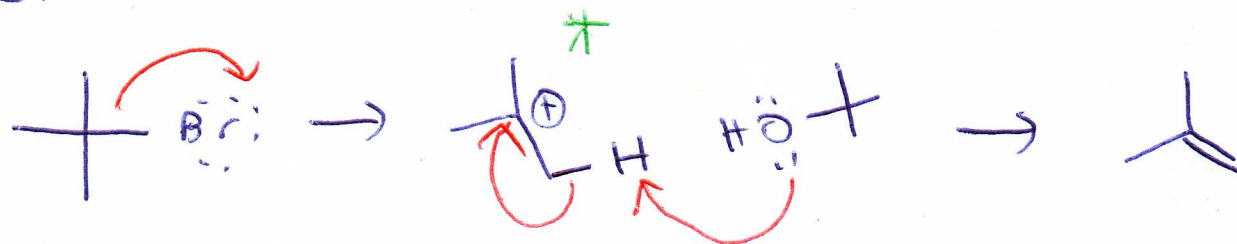


Elimination will not occur in this compound since the leaving group and the hydrogen removed will never attain the correct geometry (periplanar [0°] or antiperiplanar [180°])

E1



* Since the exact same intermediate is formed at the beginning of both the S_N1 and $E1$ reactions, they will always occur together.

1. Utility: alkyl halide \rightarrow alkene

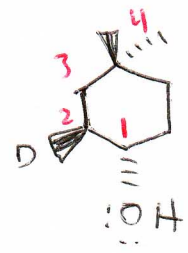
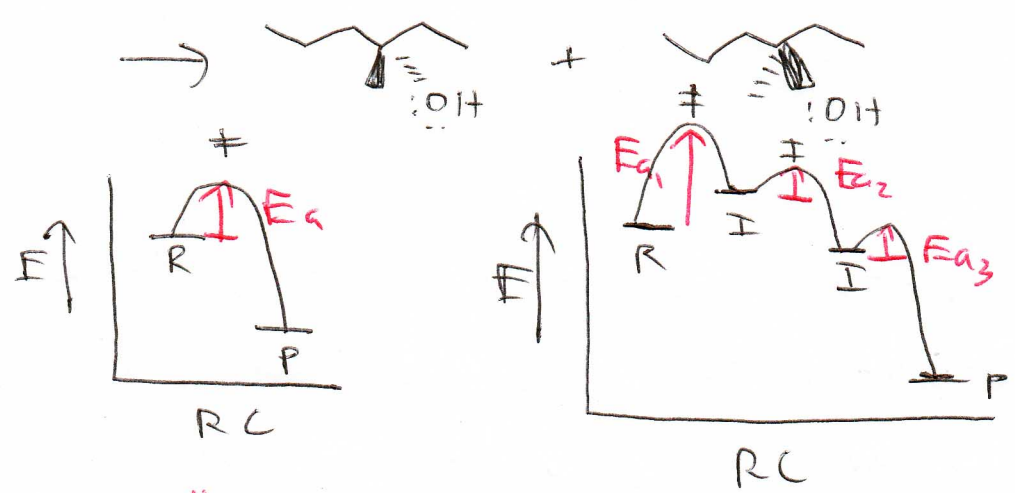
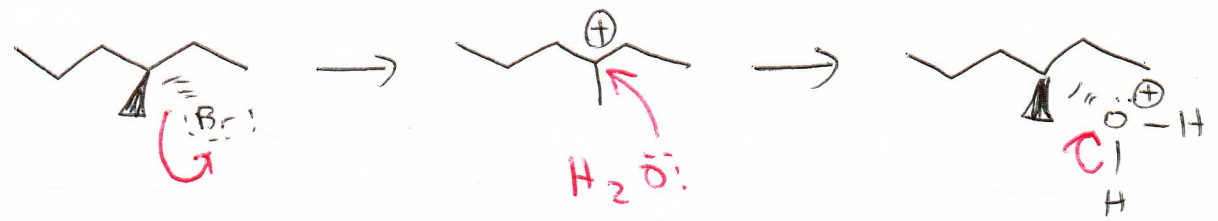
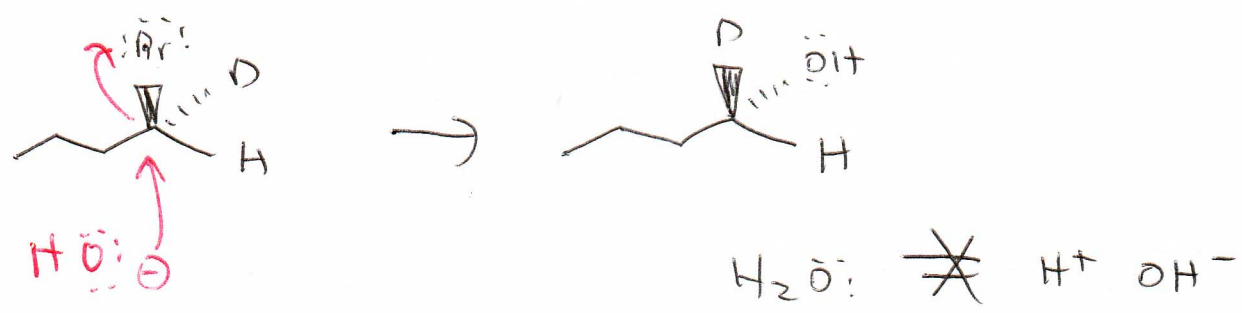
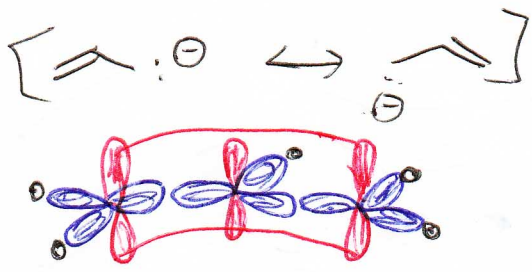
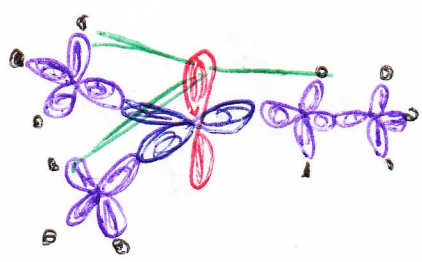
2. reagents: weak, non-basic nucleophiles

3. conditions: polar, protic solvents

5/6 \rightarrow more substituted alkenes form

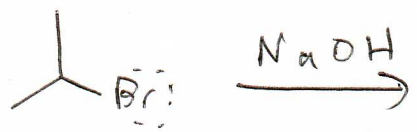
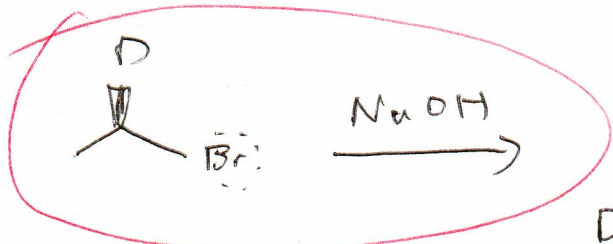
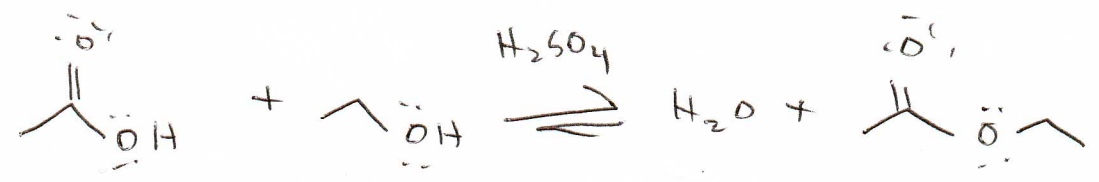
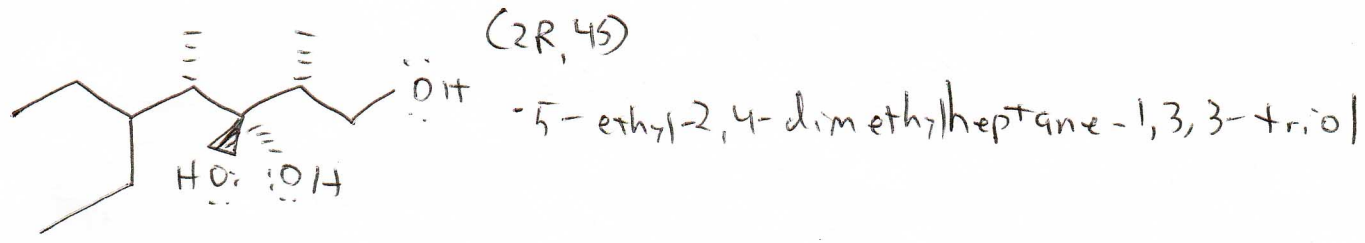
6) regiochem: carbocation shifts can occur

11/22/11

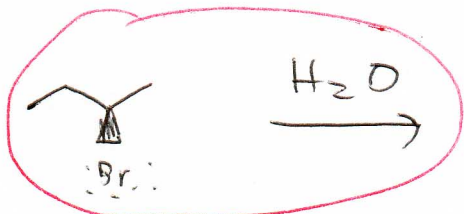


~~cyclohexanol~~

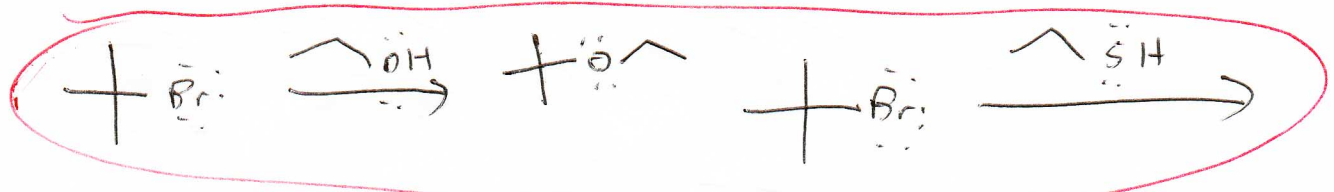
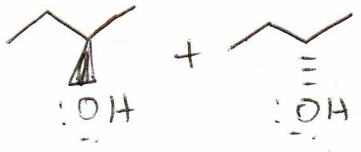
(1S, 2S)-2-deutero-4,4-dimethylcyclohexanol



S_N2 (strong, basic nucleophile)
 $1^\circ > 2^\circ$ (steric hindrance)



S_N1 (weak, non-basic nucleophile)
 $2^\circ > 1^\circ$ (hyperconjugation)

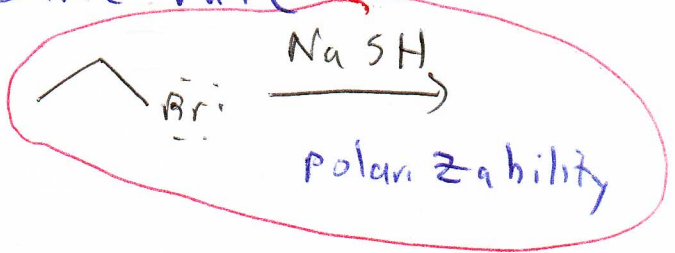


S_N1 (weak, non-basic nucleophile)

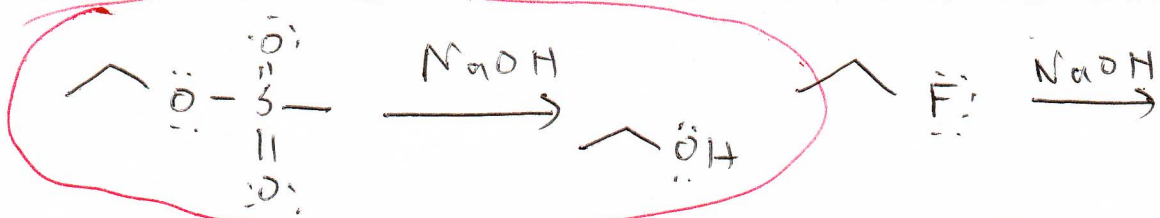
Same substrate \rightarrow same rate



S_N2 (strong, basic)



polarizability

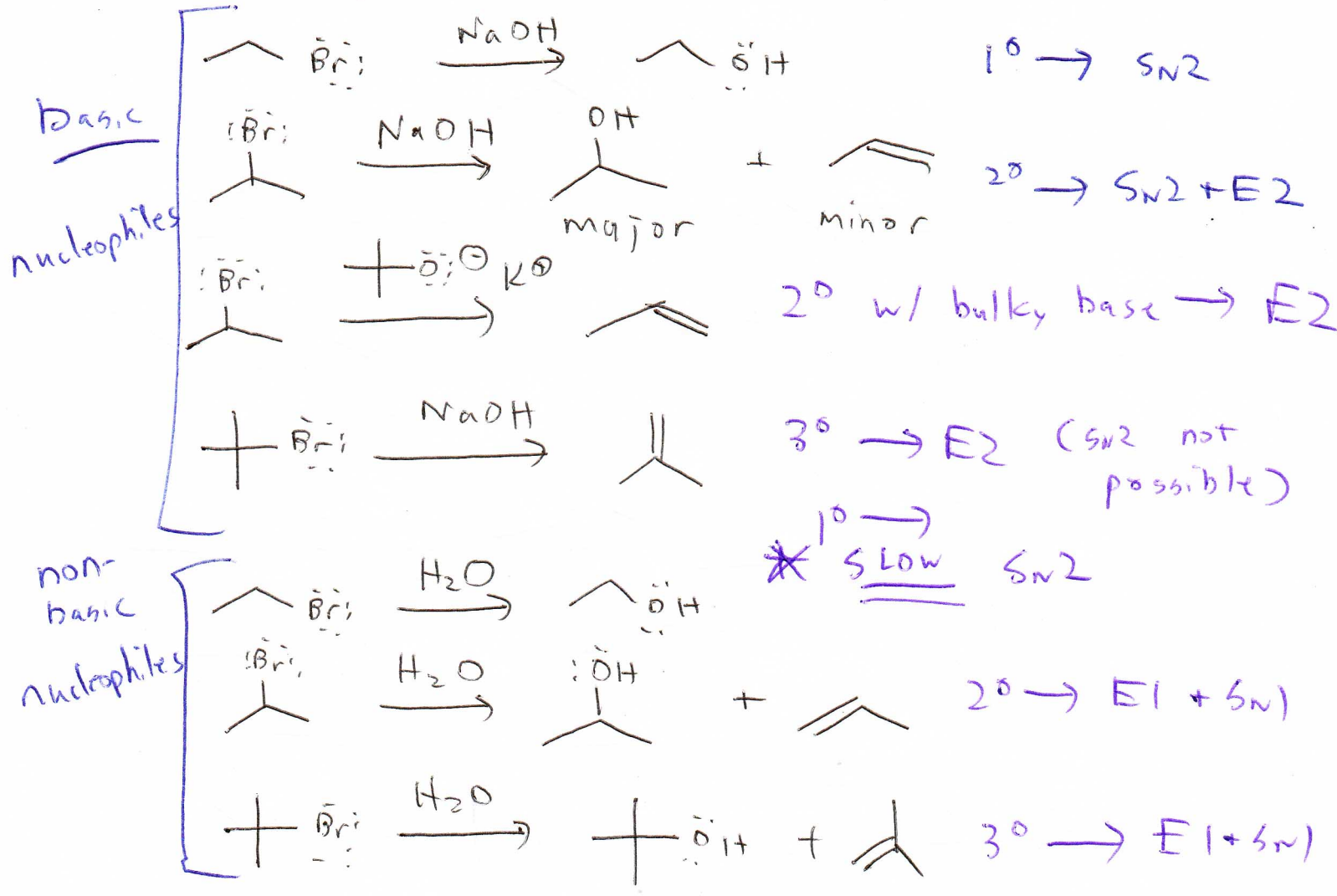


SN2 (strong, basic nucleophile, 1° substrate)

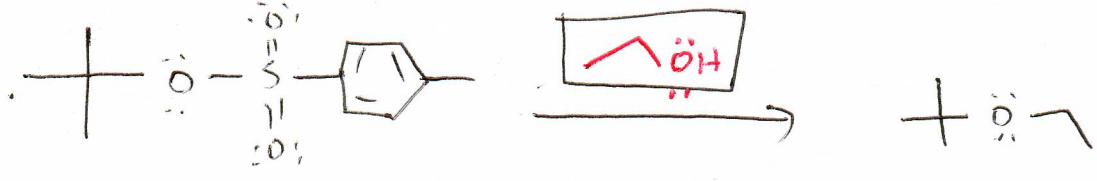
✓ Mesylate (good leaving group, conj. of strong acid)

X fluoride (poor leaving group, conj. of weak acid)

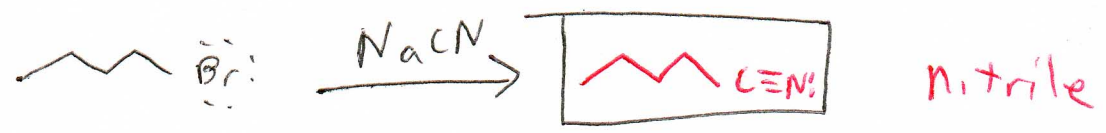
SN2 vs SN1 vs E2 vs E1



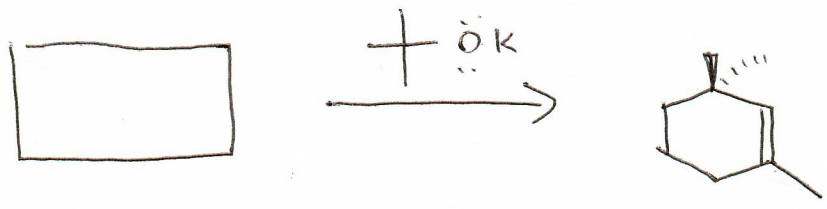
The type of rxn that occurs depends on the structure of the ~~nucleophile~~ ^{substrate} and the basicity and bulkiness of the nucleophile.



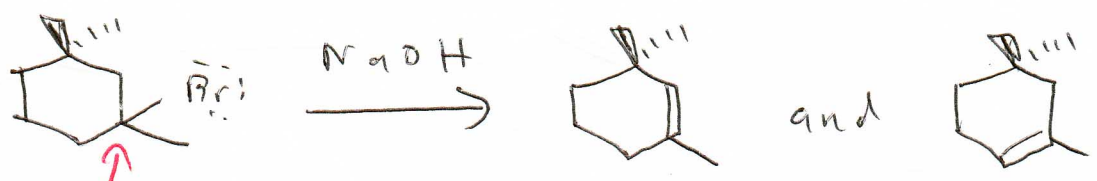
This reaction is a substitution rxn on a 3° substrate. Only S_N1 is possible, so a weak, non-basic nucleophile must be used.



S_N2 (1° substrate, basic non-bulky nucleophile)



E2 (alkene produced; strong, bulky, basic nucleophile)



not the ideal location for the leaving group since two products can be formed.

