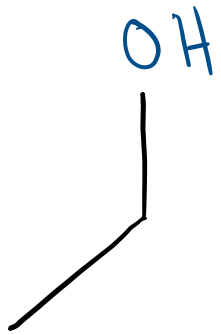
Alcohols:
Naming, Preparation, and Reactivity

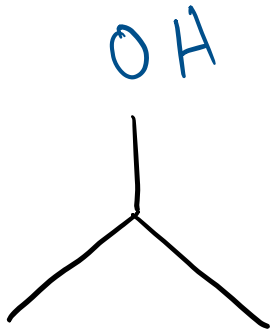
1/30/2023

Chapter 12: Alcohols

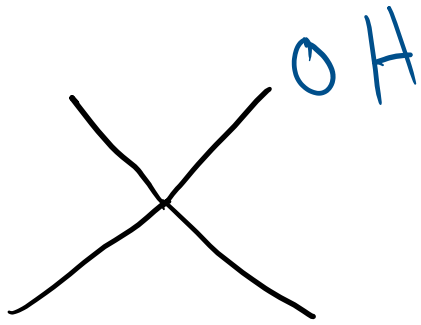
R – OH ★ water is pretty much an alcohol ★



1° primary

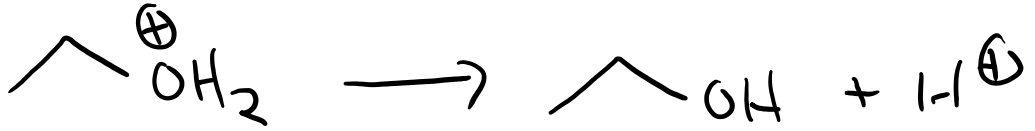


2° secondary



3° tertiary

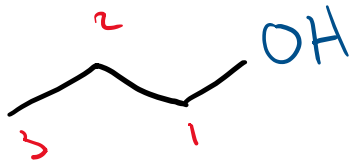
- weak acids $pKa \sim 16$ 

- weak bases $pKa_H \sim -2$ 

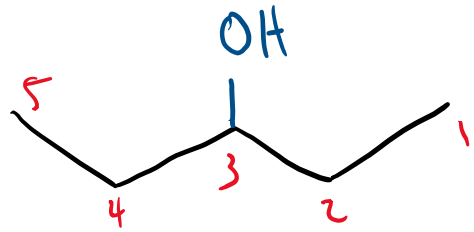
- weak nucleophile, unless deprotonate first (use NaH, $pKa_H \sim 35$)
- OH is poor leaving group, unless modified

Alcohols: Naming (12.1)

- Identify the **parent chain** – the longest carbon chain containing the –OH group as a substituent, and change the **suffix** from –ane to **-anol**

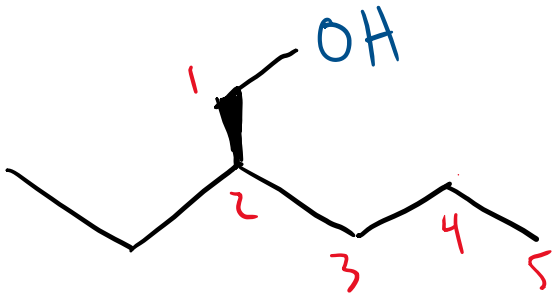


1- propanol



3- pentanol

- Add the **locant #** of the carbon bearing the -OH before the **parent chain** name. Number the **chain** so that the **-OH locant # is as small as possible.**

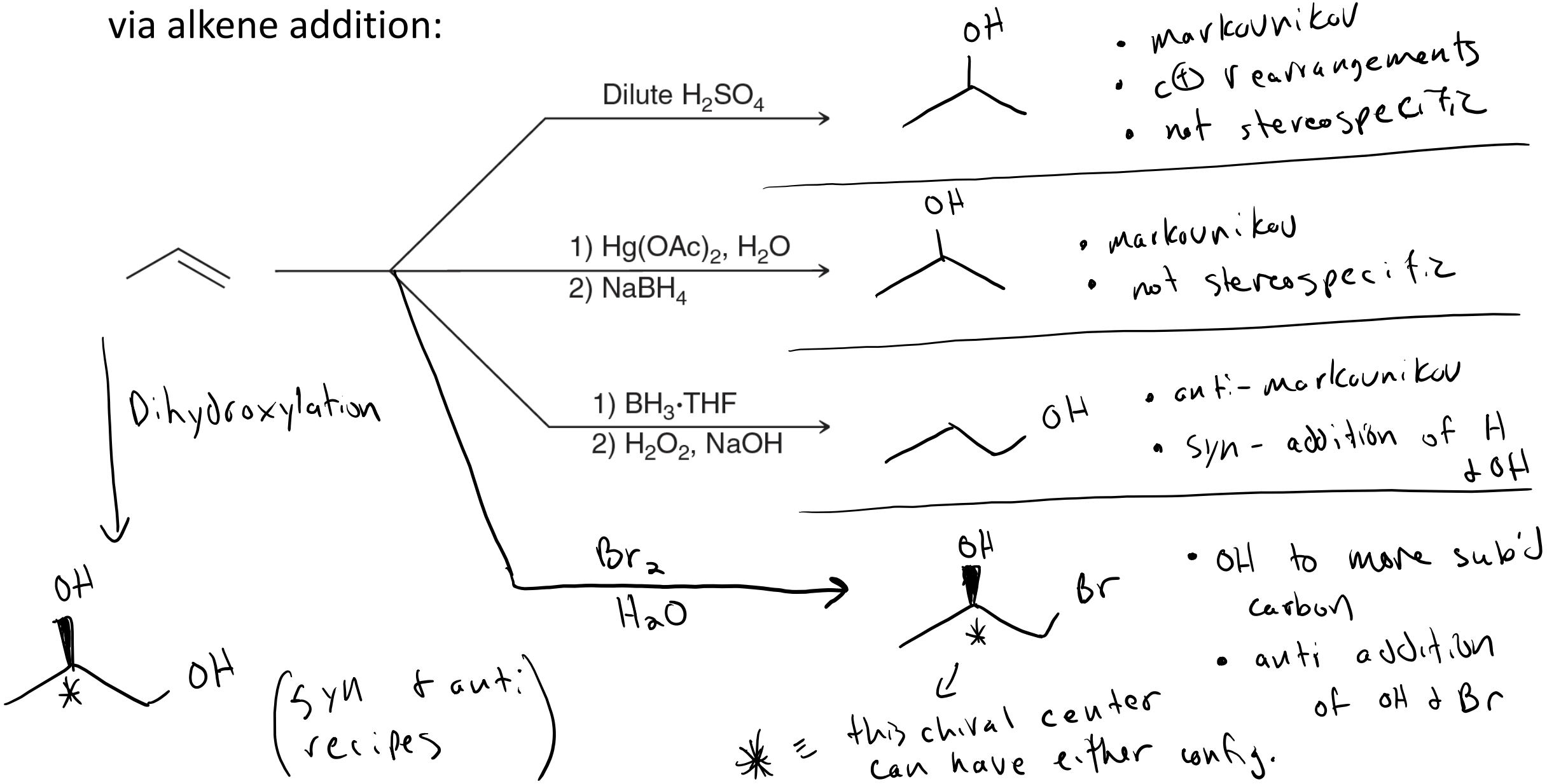


(R)- 2-ethyl - 1- pentanol

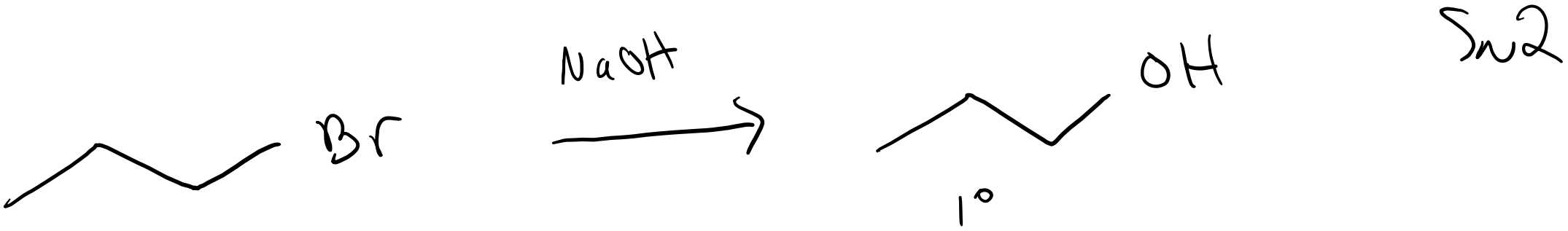
- Name the rest of the substituents, chiral centers, etc. as usual.

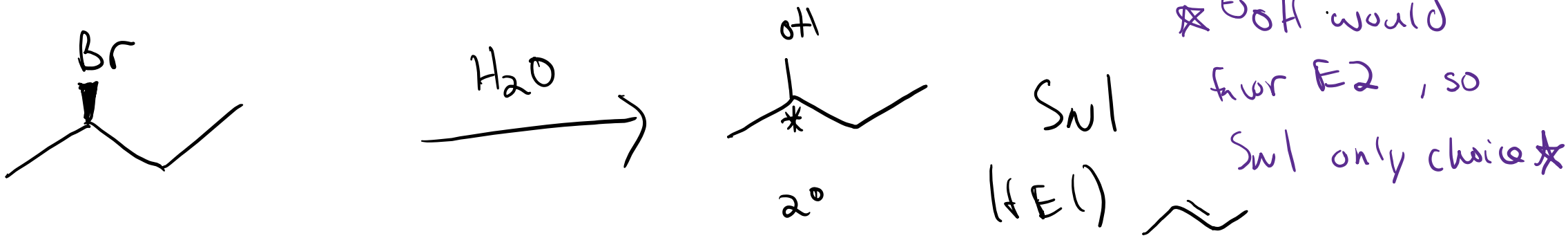
Preparation of Alcohols (Chapter 8, Che 211) (12.3)

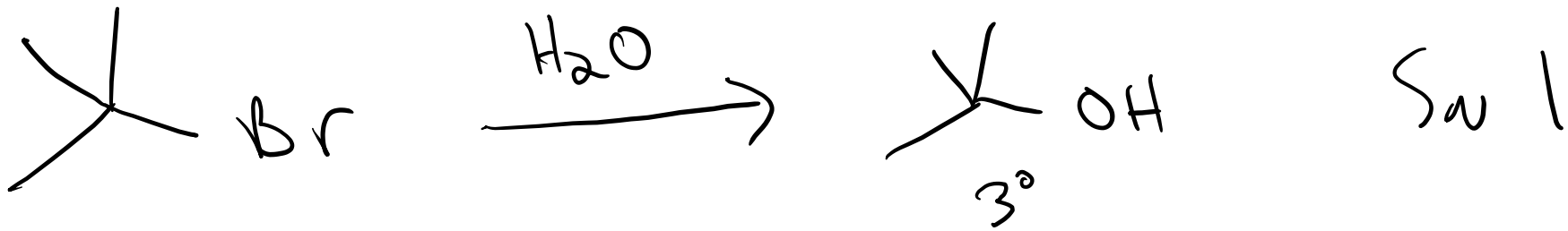
via alkene addition:



Or, via substitution:



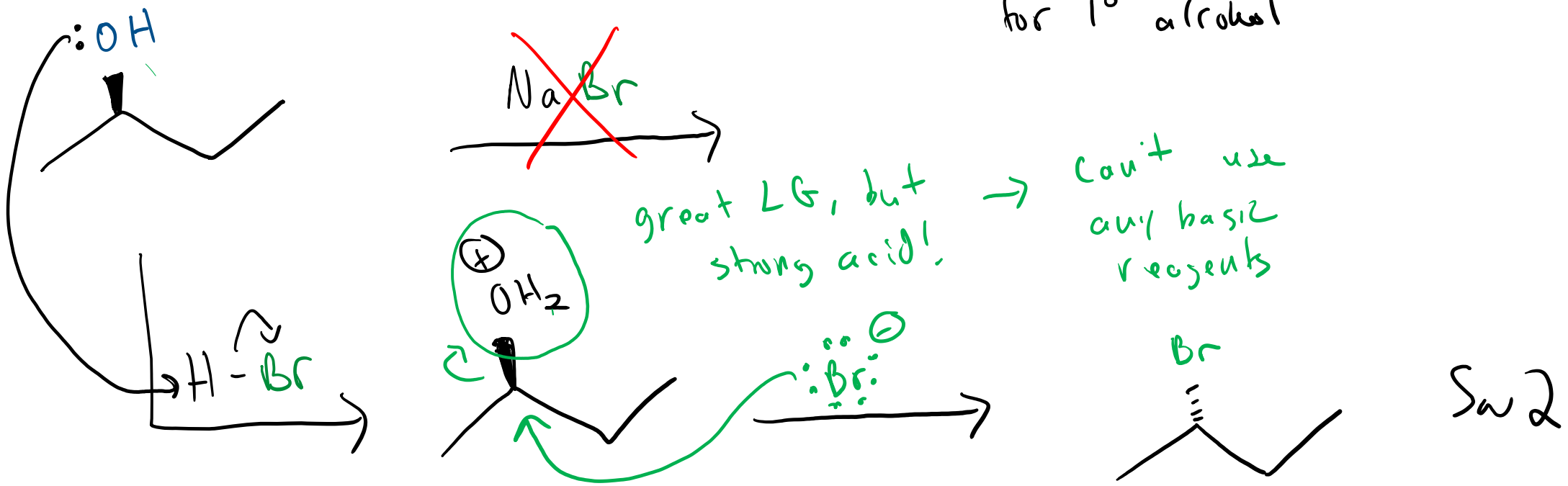




Converting –OH to a leaving group

(12.9)

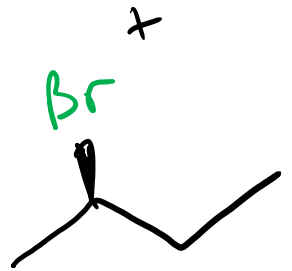
this method is best for 1° alcohol



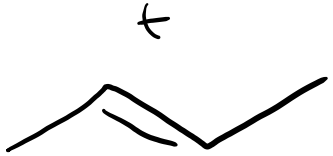
SN2

cons: - prone to C⊕ rearrangements

- SN1 product competes & can mess up stereochem
- E1 competes too

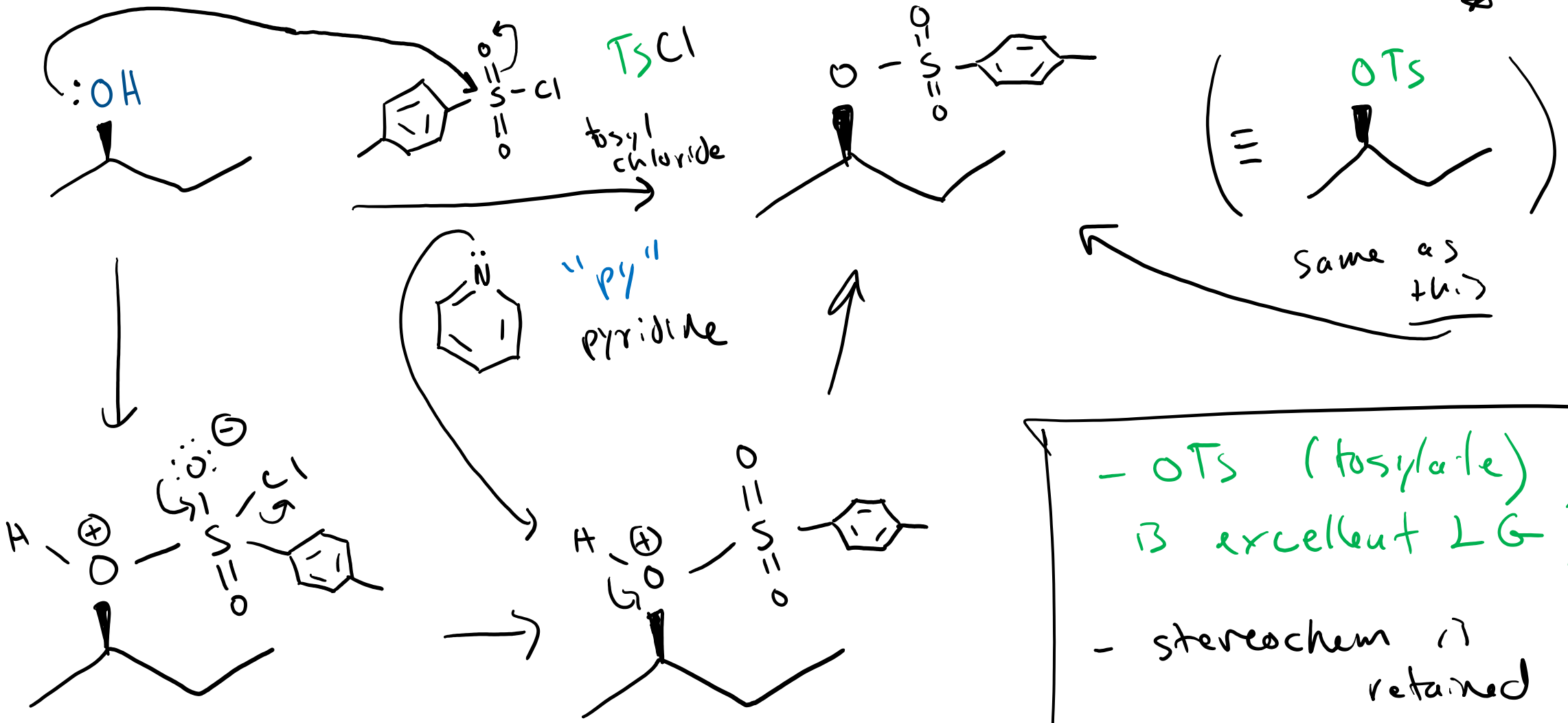


SN1



E1

Converting –OH to a leaving group ☆ do it this way for synthesis (12.9)

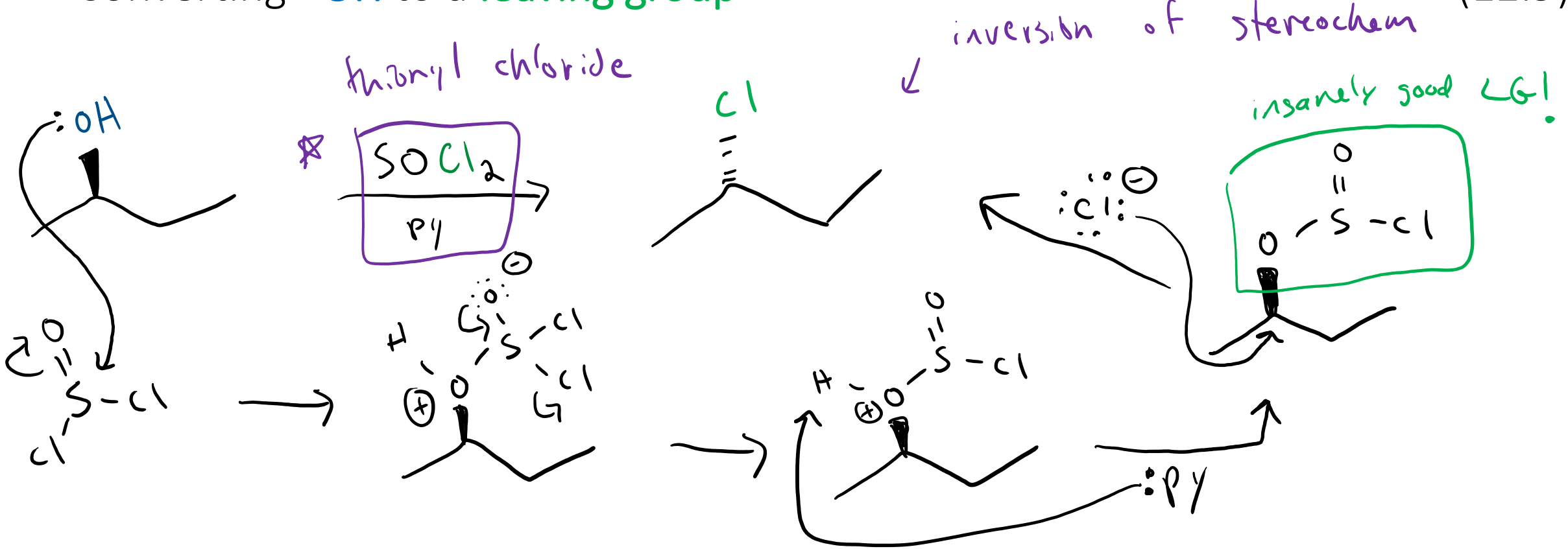


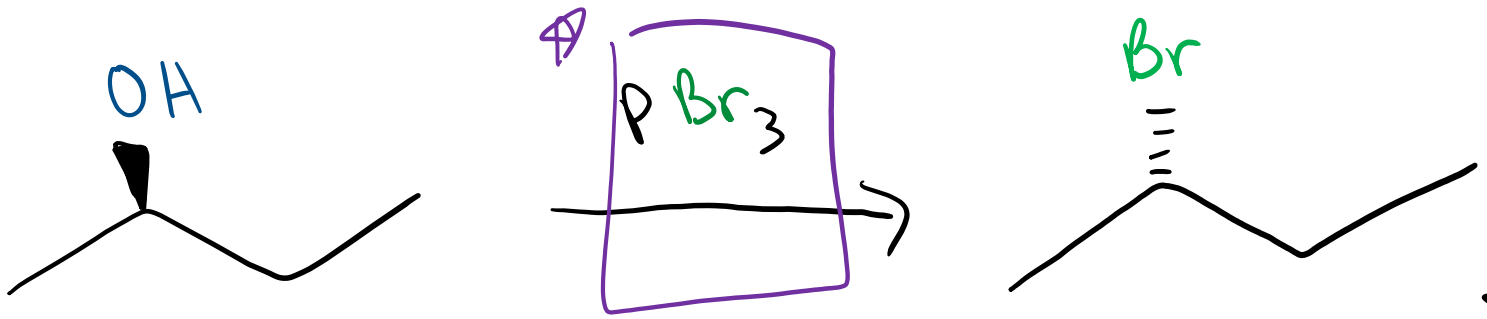
- OTs (tosylate) is excellent LG!
- stereochem is retained
- works on all alcohols (1°, 2°, 3°)

Best method for synthesis problems!

Converting –OH to a leaving group

(12.9)





inversion of stereochem

★ these two don't work well on 3° alcohol ★

Converting –OH to a nucleophile

(13.5)