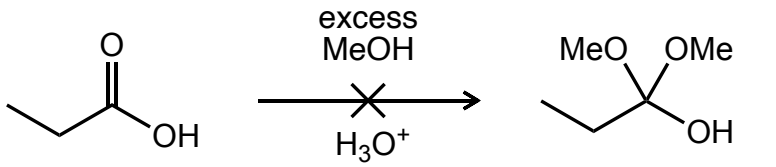
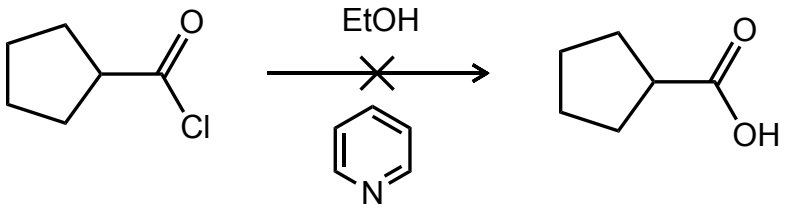
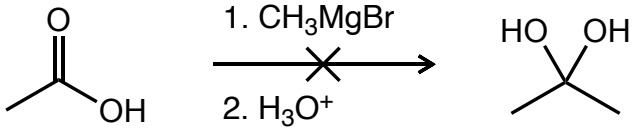
Carbonyl Substitutions - Carboxylic Acid Derivatives - Worksheet Key

1. In your own words, **explain** why **aldehydes and ketones undergo addition chemistry** whereas **carboxylic acid derivatives undergo substitution chemistry**. It may be easiest to do this using generic structures of these functional groups.

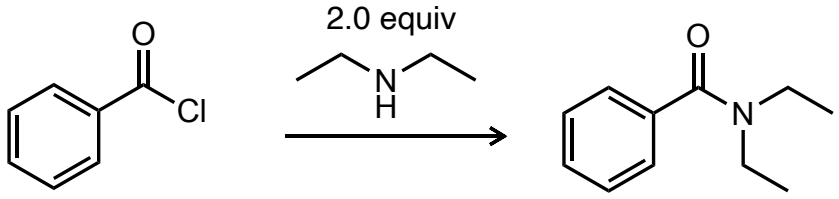
2. **The product shown** for each reaction below is **incorrect**. **Explain why** and provide the **correct product** of each reaction.



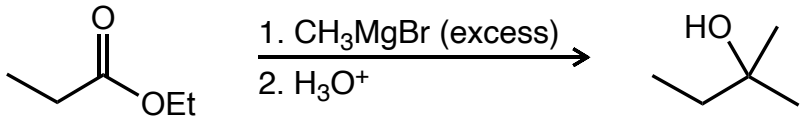




3. Reactions with acid chlorides and anhydrides generally require the use of an external base, like pyridine. Sometimes, the base used is just another equivalent of the nucleophile. With that in mind, **provide the curved-arrow mechanism** for the reaction below.



4. **Draw a curved-arrow mechanism** for the reaction below, showing the reaction between an ester with excess Grignard reagent which forms 3º alcohols. Use your mechanism to explain why this is true, despite that we learned that esters undergo carbonyl substitution reactions rather than carbonyl addition reactions.



5. **Provide** the **missing starting material**, **reagent(s)**, or **major product** of each reaction below.