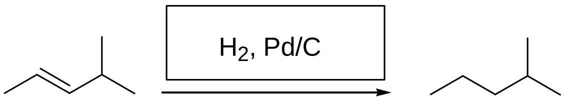
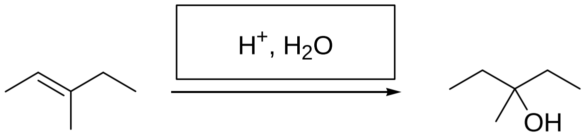
Organic Chemistry 1 – Spring 2010
Worksheet for Jacquie's recitation
Week of 2/8/10

1) Fill in the boxes with the appropriate reagent or product structures

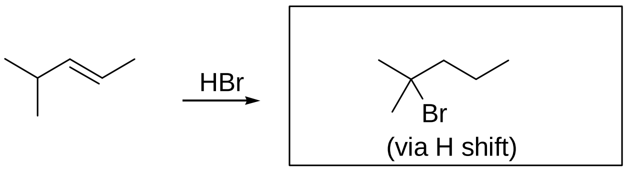
a.



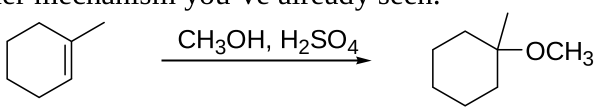
b.



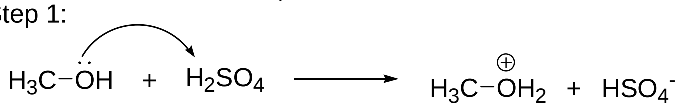
c.



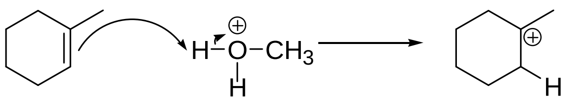
2) Provide a full stepwise mechanism for the formation of the following product. It should look very similar to another mechanism you've already seen.



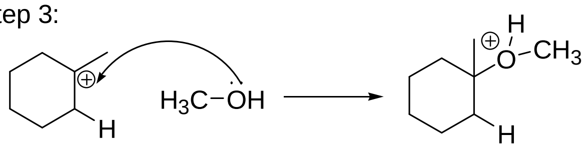
Step 1:



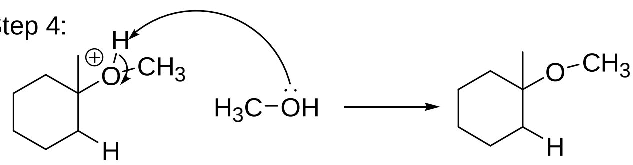
Step 2:



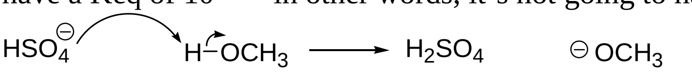
Step 3:



Step 4:

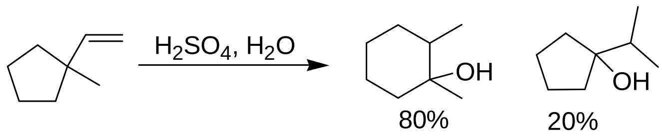


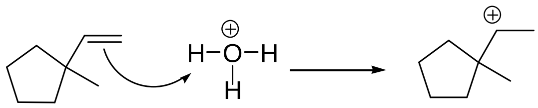
This is very similar to the mechanism of hydration, but with CH_3OH playing the role of H_2O. Note that the step shown below is **not** acceptable, because based on pKas, this reaction should have a Keq of 10^{-18} – in other words, it's not going to happen.



DON'T DO THIS

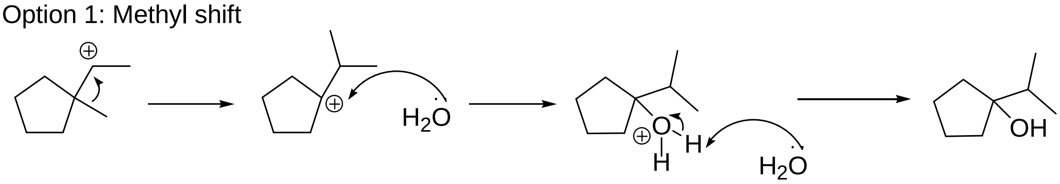
3) Provide a full stepwise mechanism for the formation of each of the following products.



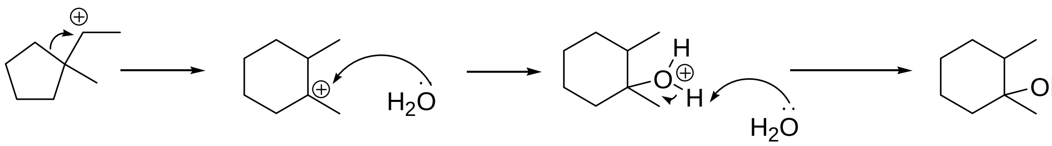


This is a 2° carbocation, so it wants to rearrange to 3° if possible. You can shift over either the methyl group or one of the ring carbons.

Option 1: Methyl shift



Option 2: Alkyl shift (of ring carbon)



A few notes:

The ring-expansion product is more favored because, as we'll see in chapter 7, six-membered rings are more stable than five-membered. That's why option 2 provides 80% of the overall product.

The proton-transfer step to make H_3O^+ will happen at the start of the reaction, but it's less important than the steps that are shown. Most of the time no one bothers to include it as a mechanistic step, or they just show the alkene picking up a proton from H_2SO_4 directly. Even though that's technically not what happens, proton transfer is often a poorly-defined step and doesn't matter too much.