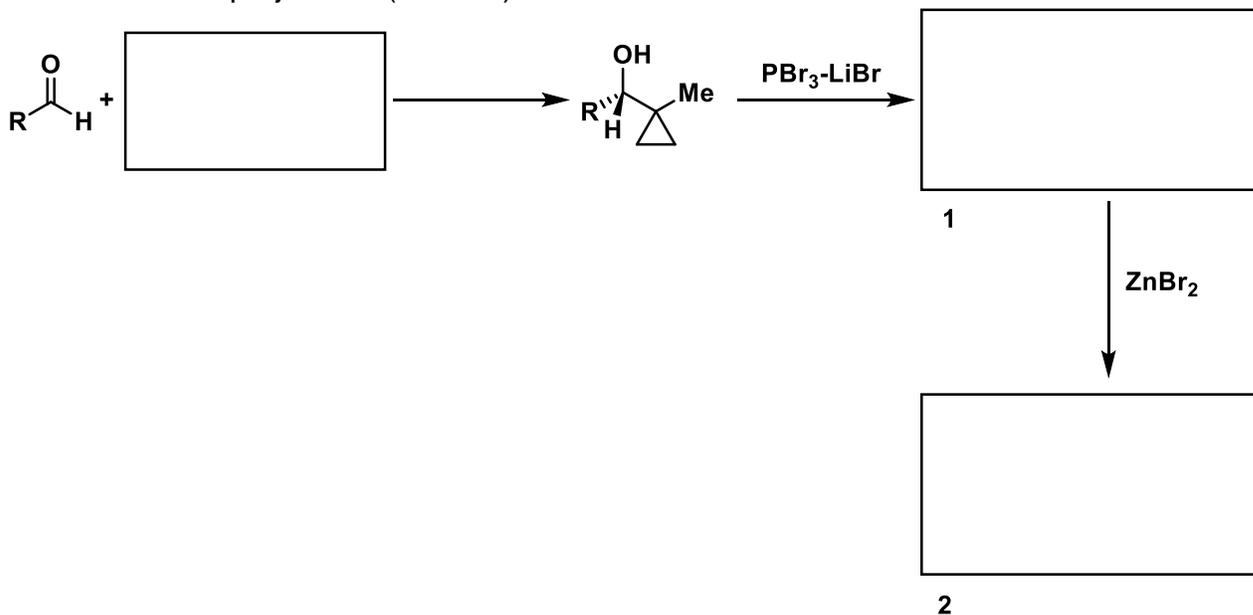






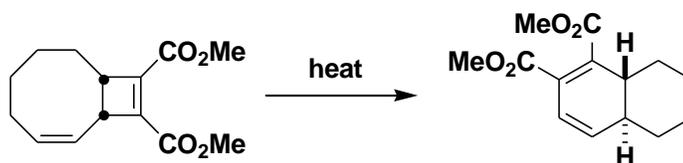
2. **Problem:** Below is a roadmap. Please provide the structures or the reagents. Also provide the mechanistic rationale for the geometric isomer outcome from **1**→**2**. Your mechanism will include a Newman projection. (15 PTS)



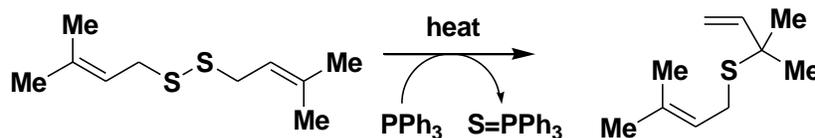
**Answer:**



3. **Problem:** Suggest a mechanism for the following reactions. (20 PTS)



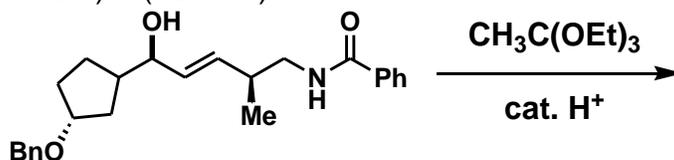
Bloomfield, *TL*, 1969, 3719.



**Answer:**



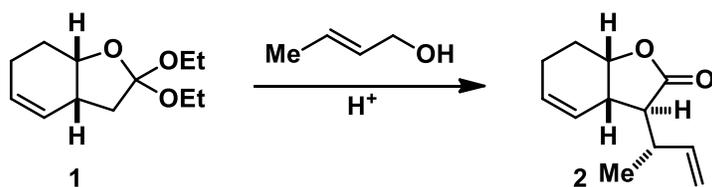
4. **Problem:** Give the product (with correct stereochemistry) and a detailed mechanism for the following reaction (you should have **more than 7 steps** in the overall mechanism which means you need to show what happens with the orthoester). What is the name of this reaction (include numbers)? (10 PTS)



**Answer:**



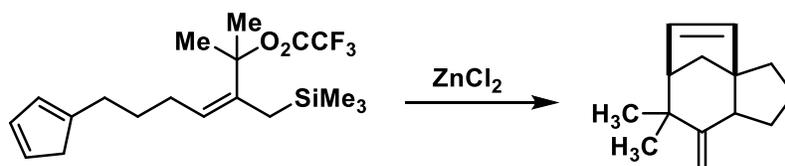
5. **Problem:** When treated with 2-butene-1-ol in the presence of an acid catalyst, **1** is stereoselectively transformed into lactone **2** (Kozlowski, *JOC* **1987**, 52, 3541). Provide a mechanism for the transformation below. In your mechanism, you **are not** required to deal with the issue of stereochemistry. (15 PTS)



**Answer:**



6. **Problem:** Provide a step-by-step mechanism for the following transformation. What is the significance of installing the TMS group at the terminal end? Based on that question, what is the effect called? (15 PTS)



**Answer:**