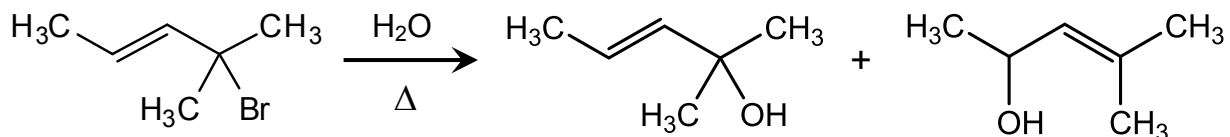


**In-Class Exercise:  
Allylic Carbocations and Electron Pushing**

You probably remember from CHEM 2301 that  $S_N1$  substitution of an alkyl halide (in boiling water, for example) involves an alkyl carbocation intermediate. Allyl halides also undergo  $S_N1$  substitution, via allyl carbocations.

1. Draw mechanisms that explain the two  $S_N1$  products shown below. In each case, illustrate each step in your mechanism using "electron pushing", in which the movement of electron pairs is indicated by a double-barbed arrow.



2. You probably also remember that  $E1$  elimination competes with  $S_N1$  substitution. What  $E1$  products would you expect from the reaction above?