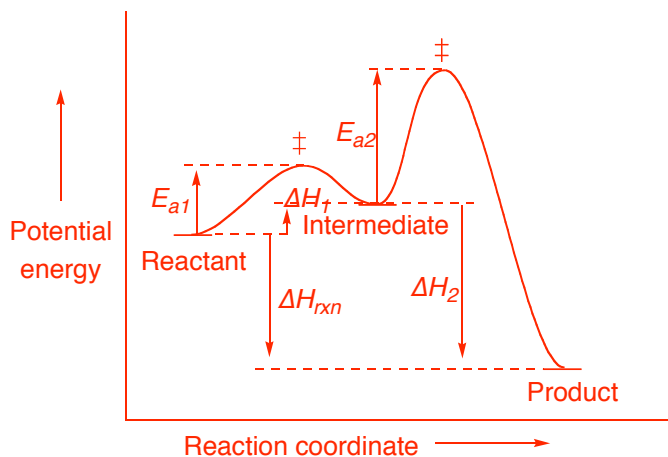
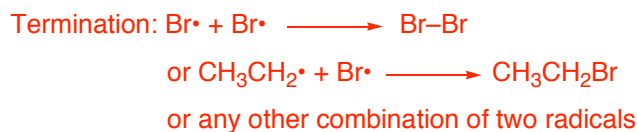
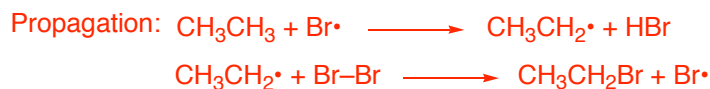
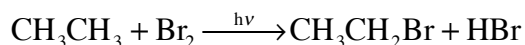


1. Draw a reaction energy diagram for a two-step reaction in which the first step is endothermic, the second step is **ex**othermic, the reaction is exothermic overall, and the second step is the rate-limiting step. Label the reactant, intermediate, product, and both transition states.

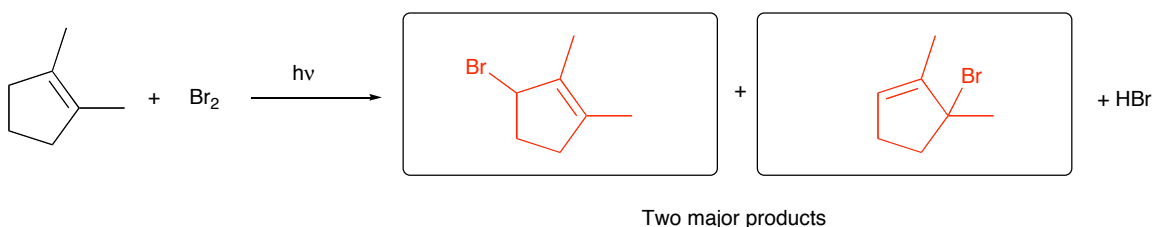
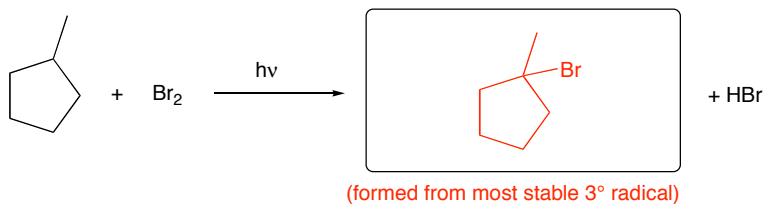


2. Draw initiation, propagation, and termination steps for the following reaction:

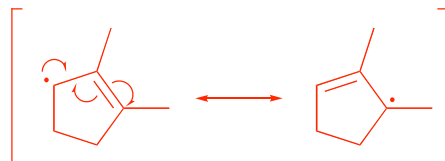


Note unless a *mechanism* is specifically asked for, there's no need to draw the curved arrows.

3. Draw the major product(s) of these reactions.



Choose to abstract a 2° H over a 1° H first, then recognize that the H on the carbon adjacent to the double bond will form a resonance-stabilized radical like this one:



and each resonance structure will be brominated to form the two products.

What determines the location of the bromine that is added?

Only the most stable carbon radical ($3^\circ > 2^\circ > 1^\circ > \text{CH}_3^\bullet$) will be brominated. If a radical is resonance-stabilized, each resonance structure will be brominated to form a major product.