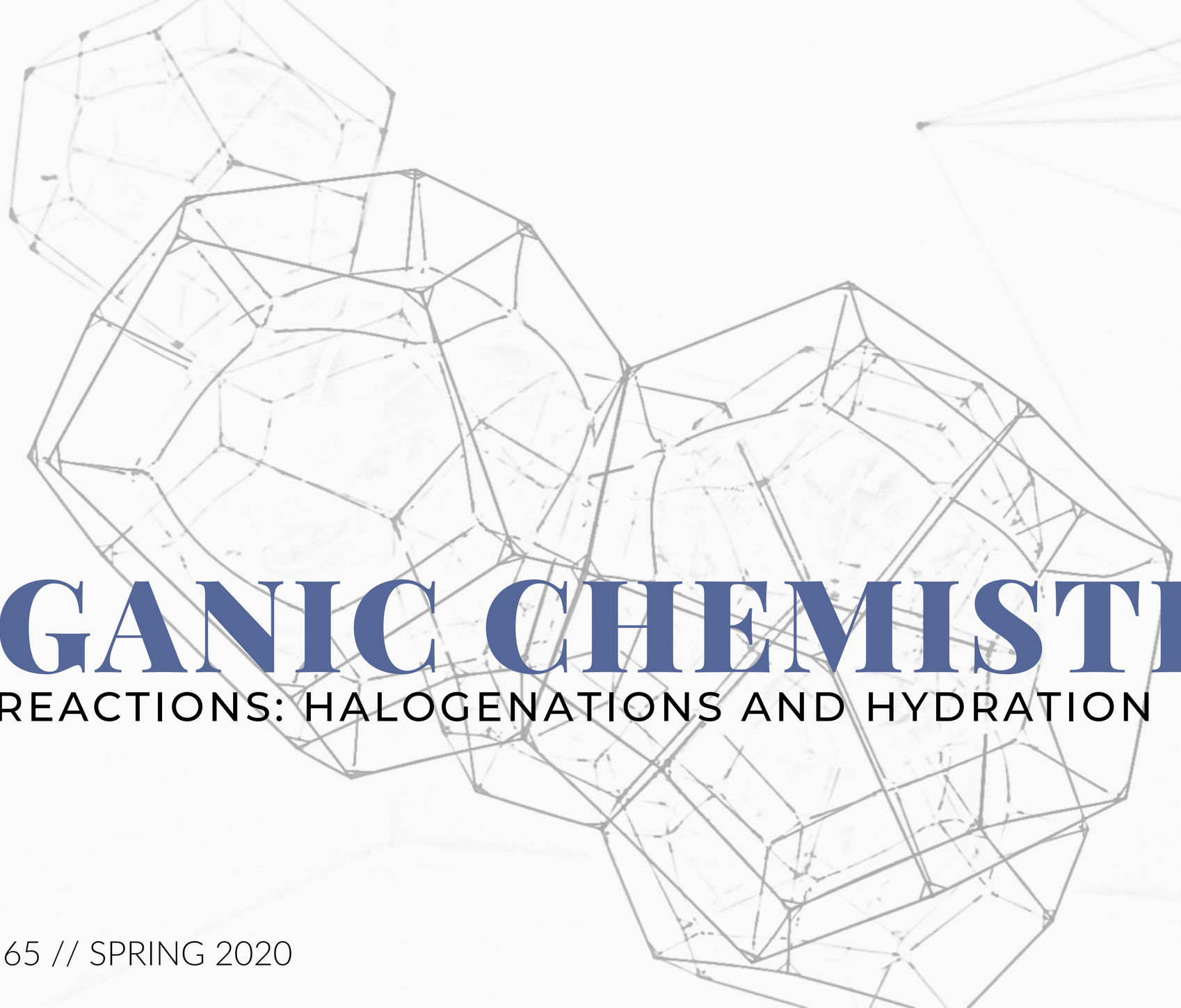


ORGANIC CHEMISTRY

ALKENE REACTIONS: HALOGENATIONS AND HYDRATION

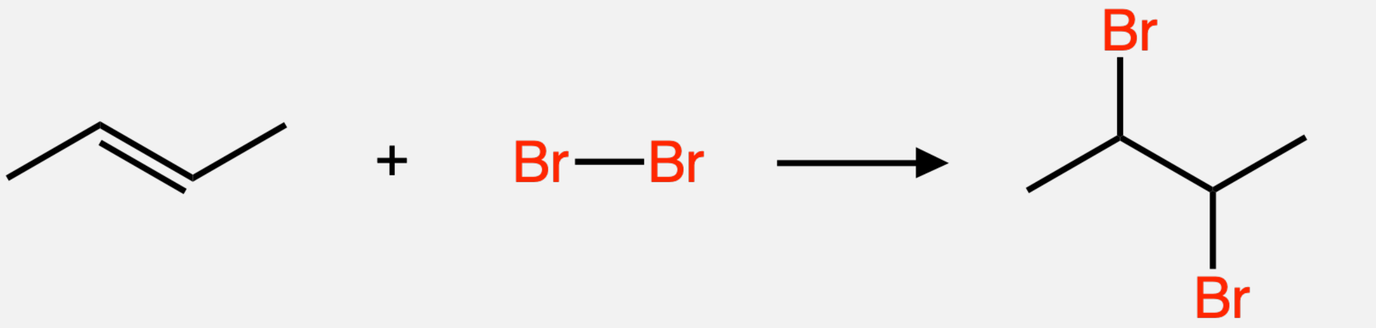
CHEMISTRY 165 // SPRING 2020

DR. MIOY T. HUYNH | 2020

Alkene halogenation (X_2)

This reaction requires an alkene and a halogen X_2 (Br_2, I_2, F_2).

Reaction: add two halogen atoms (X) to the carbon atoms on a double bond.



trans-but-2-ene

(C_4H_8)

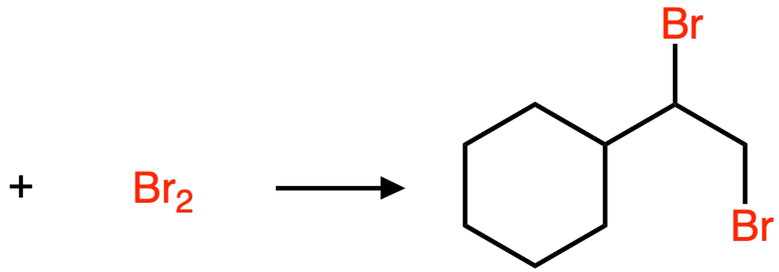
2,3-dibromobutane

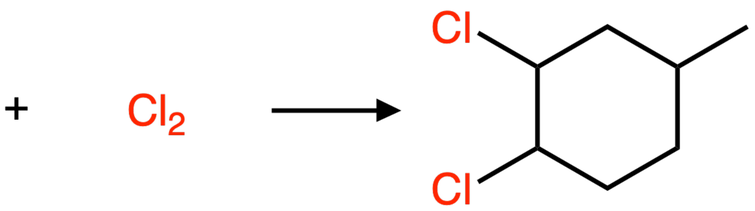
($C_4H_8Br_2$)

PRACTICE PROBLEM 1

Complete each reaction by drawing the correct missing reactant or product.

— answer —

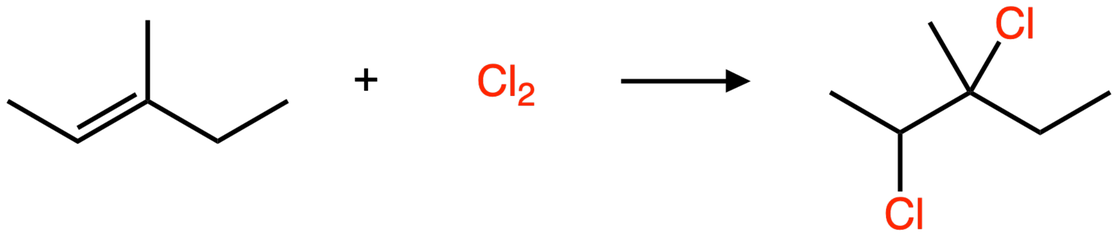


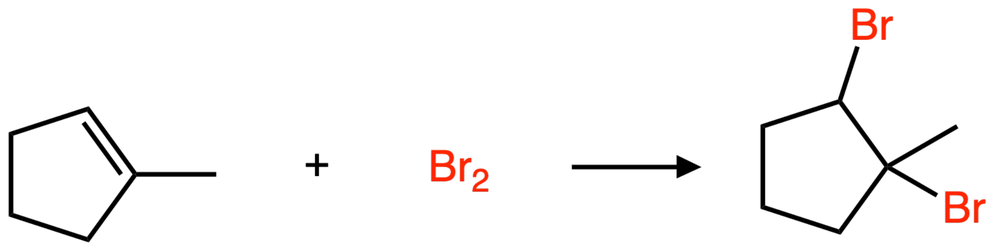


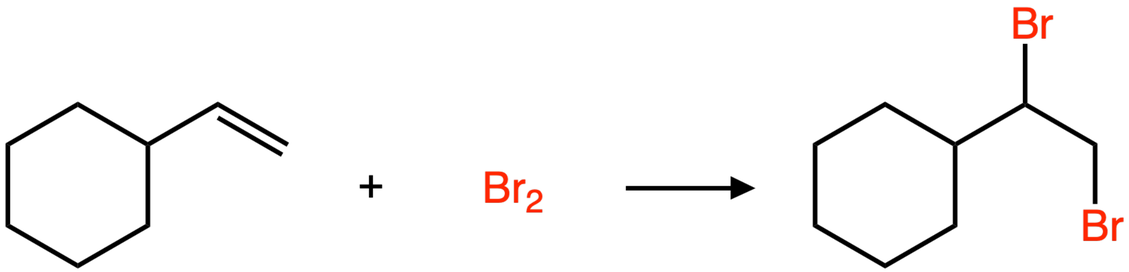
PRACTICE PROBLEM 1

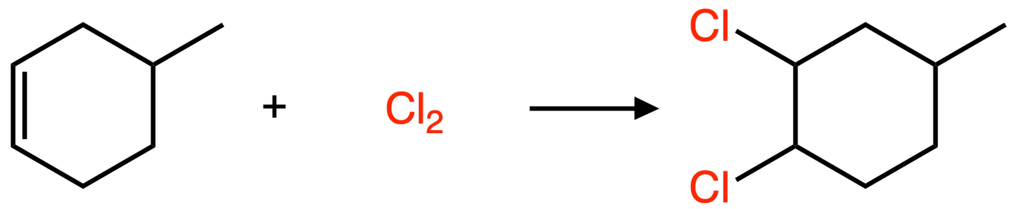
Complete each reaction by drawing the correct missing reactant or product.

— answer —







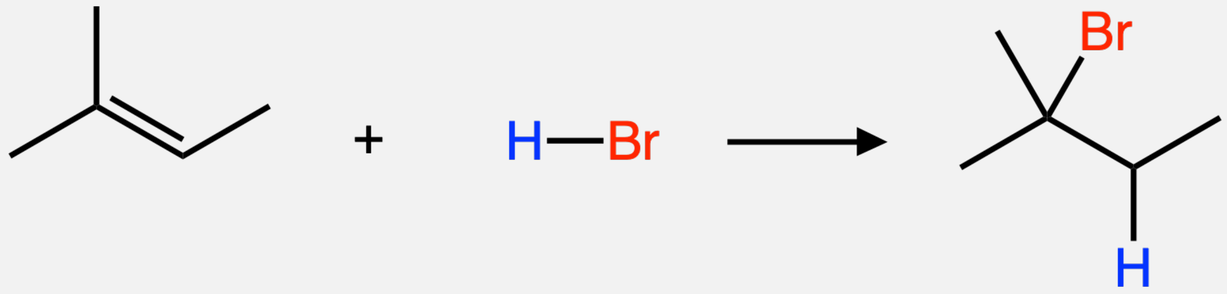


Alkene hydrohalogenation (HX)

This reaction requires an alkene and an HX (X = Br, Cl, I) molecule.

Reaction: add a hydrogen (H) atom and a halogen (X) atom across a double bond

Product: the halogen (X) atom adds to the more substituted carbon atom, and the hydrogen (H) atoms adds to the less substituted carbon atom. This is called **Markovnikov's Rule**.



2-methylprop-2-ene

(C_5H_{10})

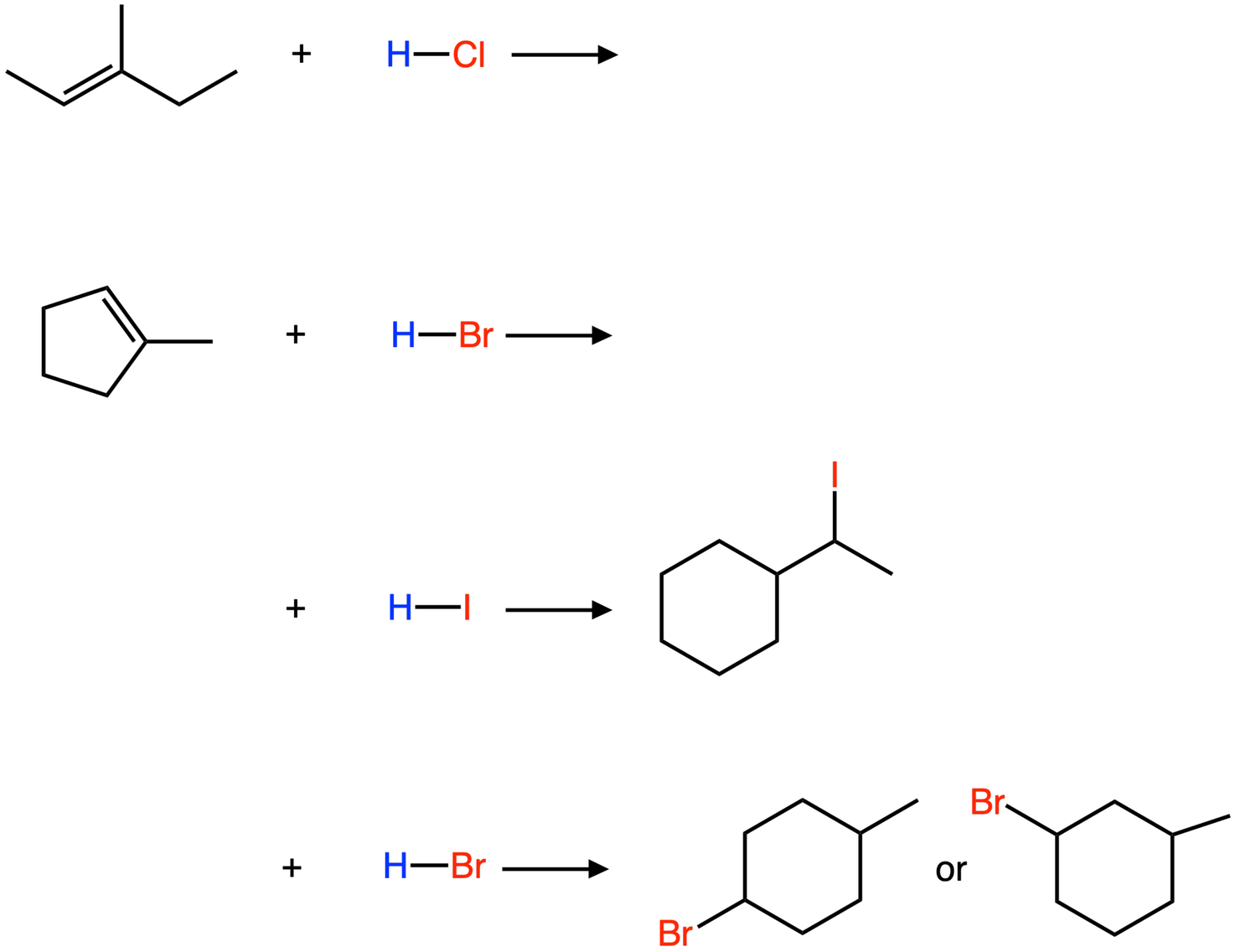
2-bromo-2-methylbutane

($C_5H_{11}Br$)

PRACTICE PROBLEM 2

Complete each reaction by drawing the correct missing reactant or product.

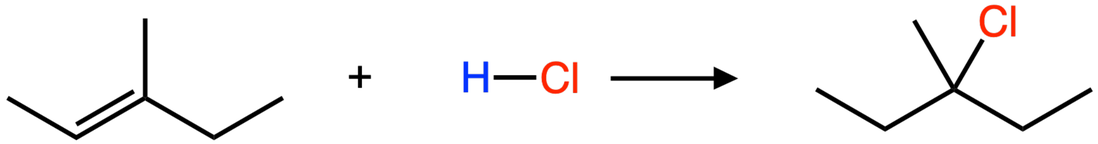
— answer —

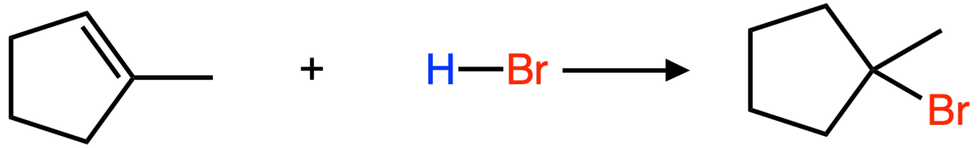


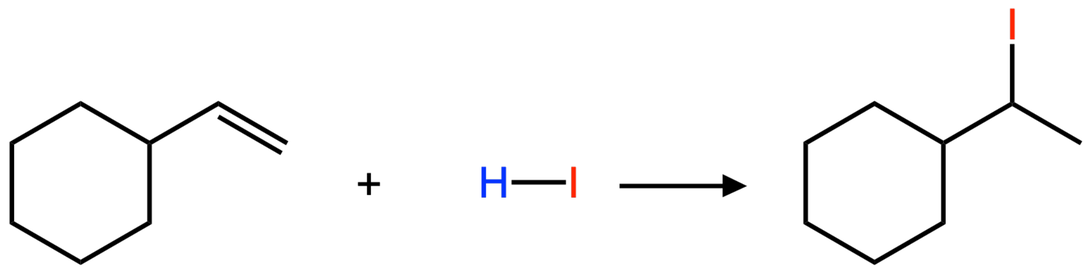
PRACTICE PROBLEM 2

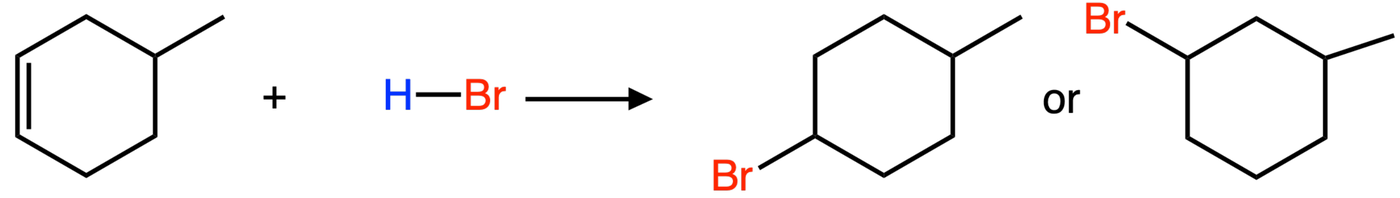
Complete each reaction by drawing the correct missing reactant or product.

— answer —







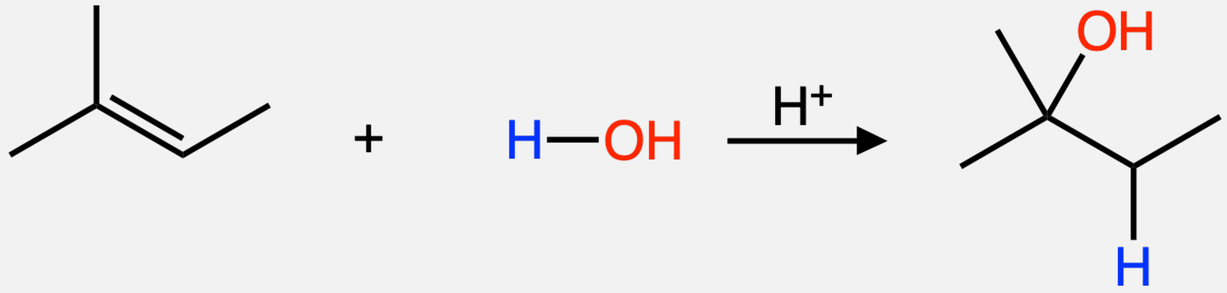


Alkene hydration (H_2O, H^+)

This reaction requires an alkene, a water molecule (H_2O), and an acid catalyst (H^+, H_3O^+, H_2SO_4, etc.).

Reaction: add a hydrogen (H) atom and a hydroxide (-OH) group across a double bond

Product: the hydroxide (-OH) group adds to the more substituted carbon atom, and the hydrogen (H) atoms adds to the less substituted carbon atom. This still follows **Markovnikov's Rule**.



2-methylprop-2-ene

(C_5H_{10})

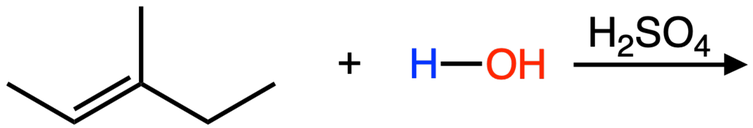
2-methylbutan-2-ol

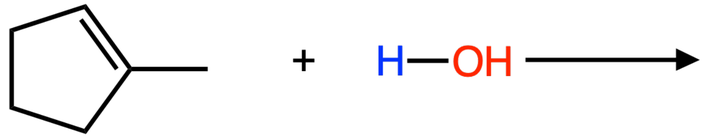
($C_5H_{11}OH$)

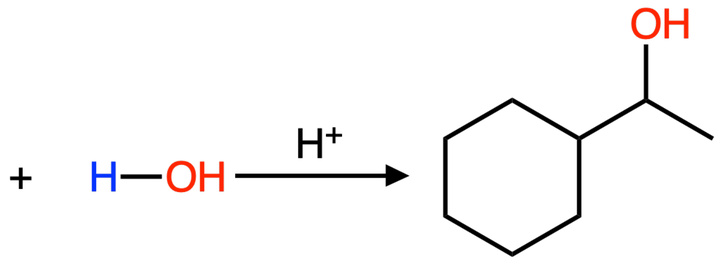
PRACTICE PROBLEM 3

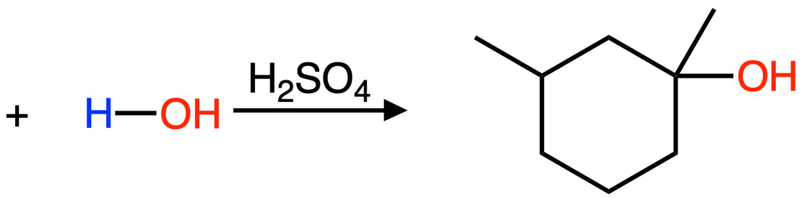
Complete each reaction by drawing the correct missing reactant or product.

— answer —





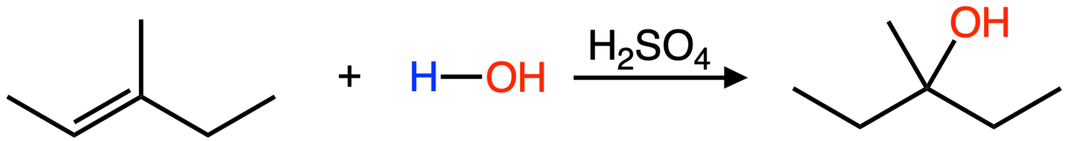


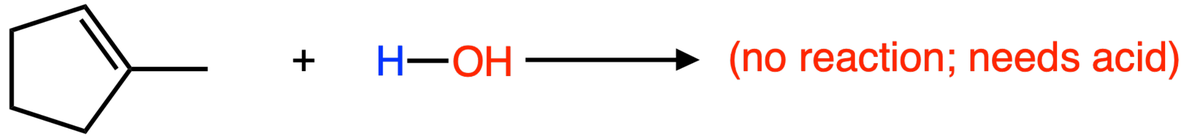


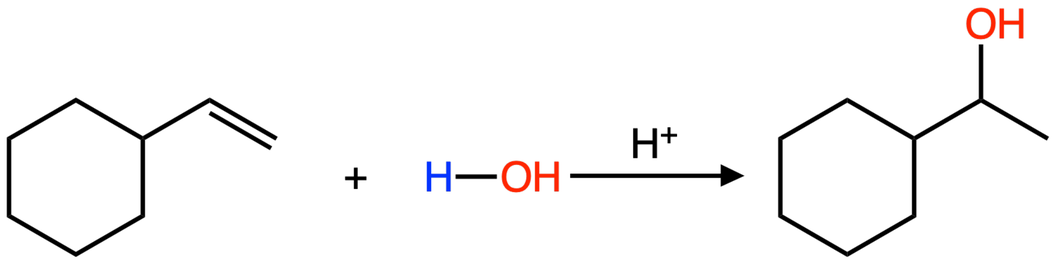
PRACTICE PROBLEM 3

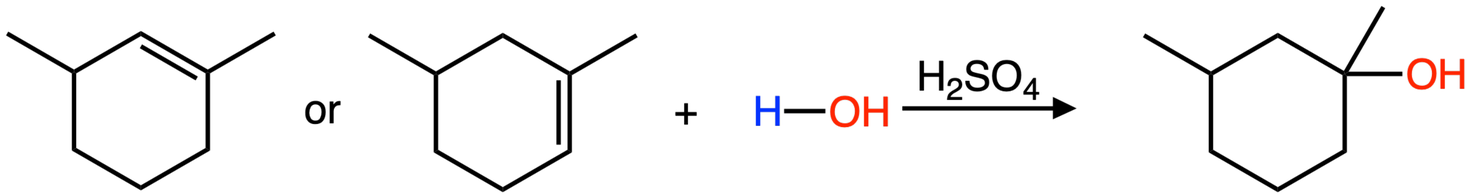
Complete each reaction by drawing the correct missing reactant or product.

— answer —





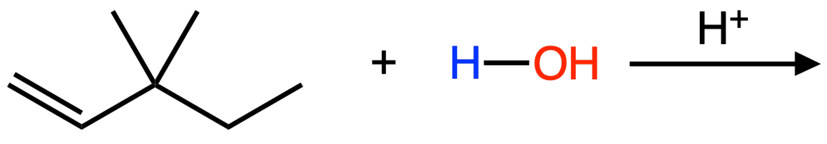


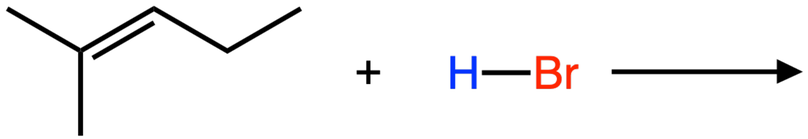


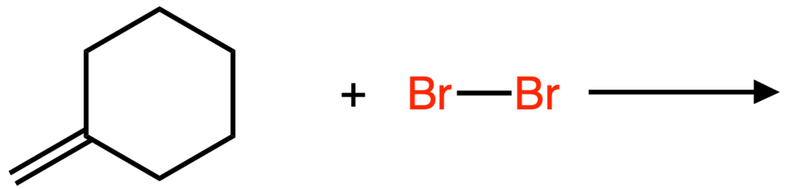
PRACTICE PROBLEM 4

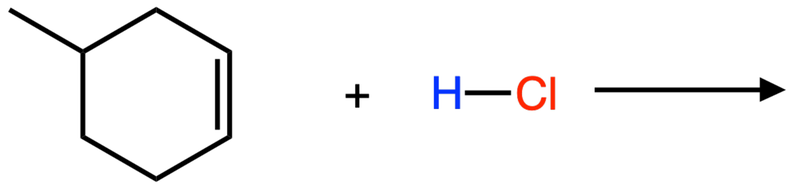
Which of the following reaction(s) would yield products with a new chiral center?

— answer —









PRACTICE PROBLEM 4

Which of the following reaction(s) would yield products with a new chiral center?

— answer —