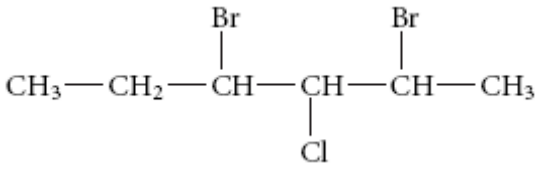
Naming and Drawing Alkyl Halides

- **Identify the root:**
  Locate the longest chain that includes the halogen atom(s). Name the parent alkane.
- **Identify the prefix:**
  – Number the parent carbon chain starting at the end nearest the halogen atom(s). If the compound is a cycloalkane, numbering starts at the carbon atom bonded to the halogen atom.
  – Name and number any alkyl side groups on the main chain.
  – Insert the number(s) of the carbon atom(s) bonded to the halogen(s).
  – Use the prefix(es) that identify the specific halogen(s) (chloro-, fluoro-, bromo-, iodo-)
  – If there are two or more of the same type of halogen, use a prefix to indicate the number.
  – If there is more than one type of halogen present, write them alphabetically. Any prefixes (di-, tri-) are not considered when alphabetizing the terms.

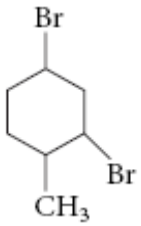
Sample Problem

Name the following alkyl halides.

(a)



(b)



Solution

(a) Identify the root: The chain has six carbon atoms, therefore, the parent compound is hexane.

Identify the prefix: The carbon atom on the right end is nearest the first halogen so numbering starts at the right end. There is a bromine atom on carbon number two and carbon number four. The prefix will include 2,4-dibromo-. There is a chlorine atom on carbon atom number three so the prefix will include 3-chloro-. Alphabetically, bromo- is before chloro-. The name of the compound is **2,4-dibromo-3-chlorohexane**.

(b) Identify the root: The parent compound is a cyclohexane.

Identify the prefix: Two bromine atoms are present as well as a methyl group. Numbering begins at a bromine atom and proceeds toward the second bromine and also in a direction that will give the methyl group the lowest possible number. Therefore, numbering begins at the top and proceeds clockwise, placing the second bromine atom on carbon atom number three. This places the methyl group on carbon atom number four. The prefix is thus 1,3-dibromo-4-methyl-. The full name of the compound is **1,3-dibromo-4-methylcyclohexane**.