CYCLIC HYDROCARBONS

- Cyclic hydrocarbons can be alkanes, alkenes, alkynes, alkyl halides, or alcohols that are simply connected in a ring instead of a straight chain

- Naming Cyclic Hydrocarbons

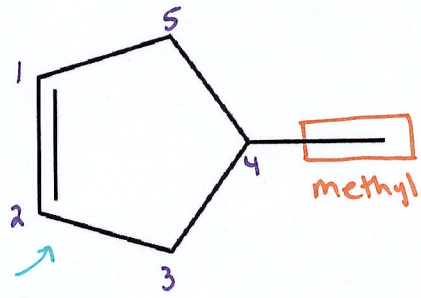
Step 1: Identify the root
  - Determine the number of carbon atoms in the ring → this becomes the root
  - The word "cyclo" is attached to the front of the root to indicate a ring configuration

Step 2: Identify the suffix
  - Determine if a single, double, or triple bond exists or if a hydroxyl group is present to determine the appropriate ending for the name

Step 3: Identify the prefix
  - Same rules as with alkanes, alkenes, and alkynes
  - When numbering the carbons in the ring, the double or triple bond will <u>always</u> take priority over any side groups. Therefore it is not necessary to indicate the location of the double or triple bond in a cyclic compound because it will always be on carbon #1
  - If no side groups are present, there is no need to number the carbons in the ring

EXAMPLES: Name the following organic molecules

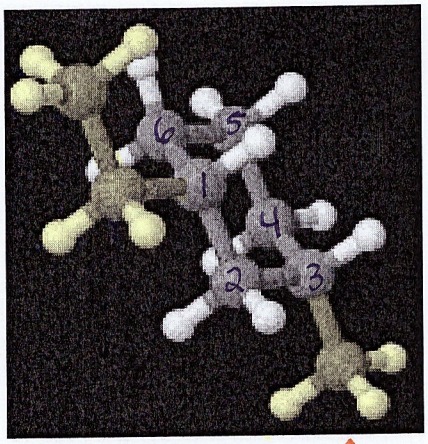
1.



5 carbon ring
∴ cyclopent

4-methylcyclopentene
↳ double bond

2.

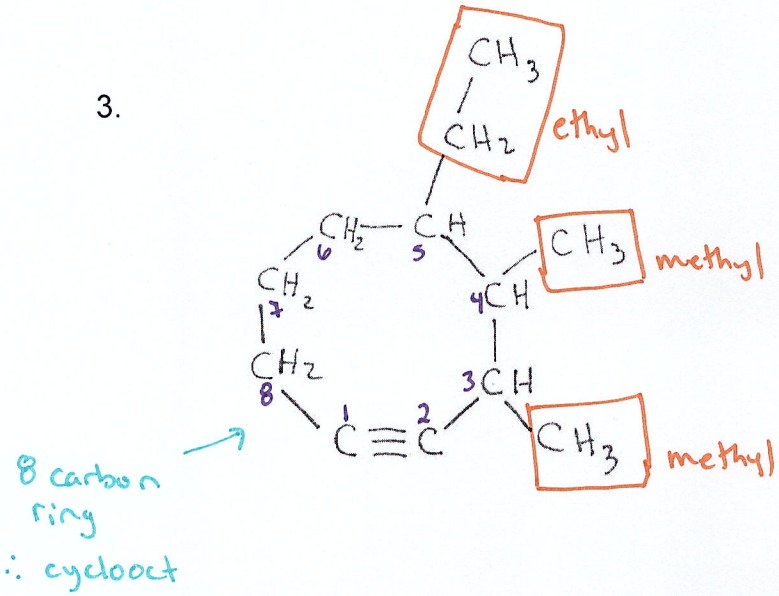


6 carbon ring
∴ cyclohex

↑ methyl

1-ethyl-3-methylcyclohexane
↳ all single bonds

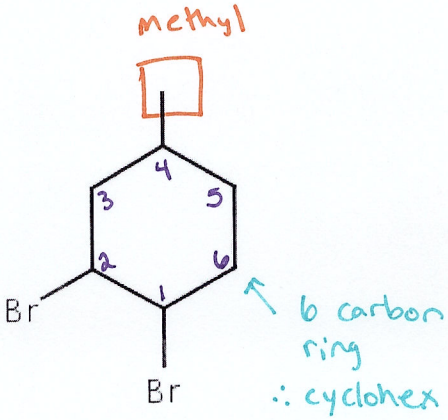
3.



5-ethyl-3,4-dimethylcyclooctyne

triple bond

4.



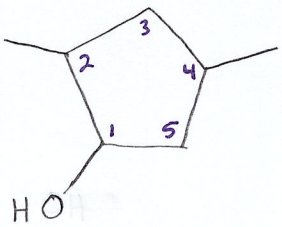
1,2-dibromo-4-methylcyclohexane

all single bonds

Example: Draw the line structural diagram for 2,4-dimethylcyclopentanol.

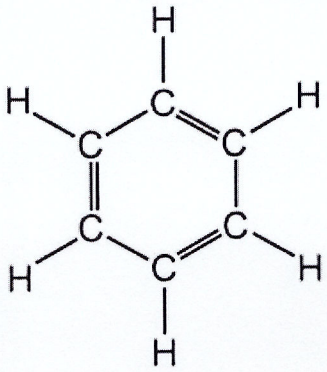
5 carbon ring

hydroxyl group



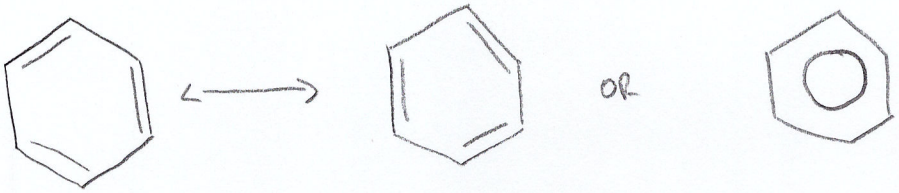
*****Now try pg.559 #18-21 & pg. 567 #28c, 29e*****

AROMATIC HYDROCARBONS



- **Aromatic compounds** are hydrocarbons the contain a *benzene ring*
  - A **benzene** ring is a six-carbon ring with one hydrogen atom bonded to each carbon because of alternative double and single bonds between the carbon atoms, thus having a chemical formula of C_6H_6
  - The name "aromatic" implies that these compounds often have strong aromas/smells

*unsaturated!



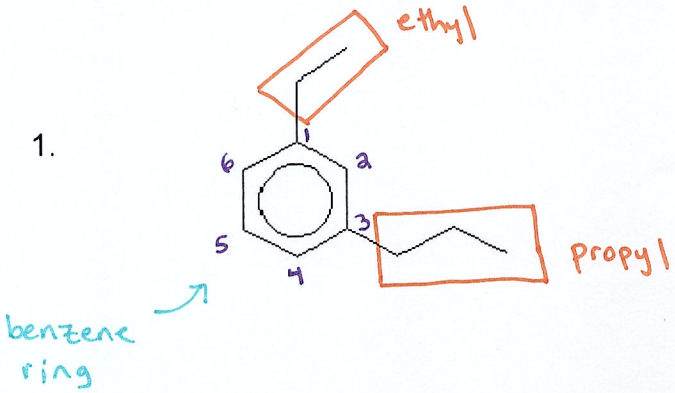
- **Aliphatic compounds** are any hydrocarbons that **do not** contain a benzene ring (aliphatic compounds can include alkanes, alkenes, alkynes, and cyclic hydrocarbon)

- Naming Aromatic Hydrocarbons
  Step 1: If a molecule contains a benzene ring, the root and suffix is "-benzene"
  Step 2: Identify the prefix
  - The six carbons in the benzene ring are numbered to locate the presence of more than one side group
  - Numbering continues in the direction of the nearest side group
  - When a benzene ring is a side group, it is called a **phenyl group**

↳ when carbon chain is 7 carbons or more

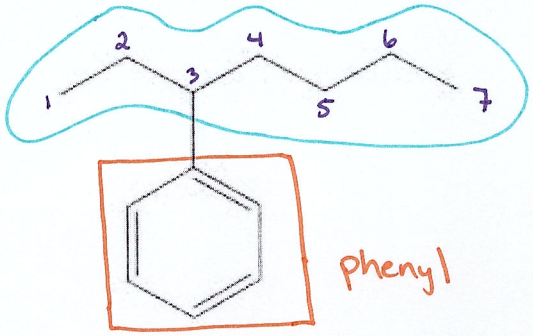
EXAMPLES: Name the following aromatic compounds.

1.



1-ethyl-3-propylbenzene

2.



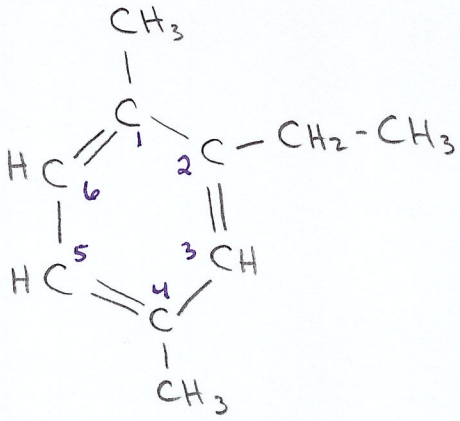
← 7 carbon main chain
∴ hept

phenyl

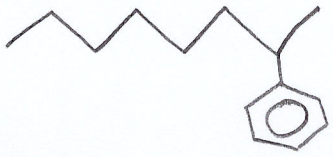
3-phenylheptane
↳ all single bonds in main chain!

EXAMPLES: Draw the following organic compounds.

1. 2-ethyl-1,4-dimethylbenzene
↳ main part



2. 2-phenyloctane
↳ 8 carbon main chain (alkane)



Now try pg. 562 #24-27