Chemistry 11

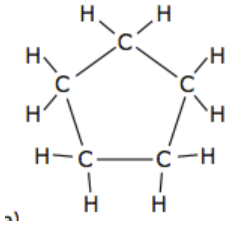
Organic Chemistry III

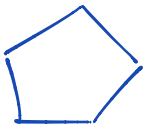
Name: Notes
Date:
Block:

1. **Cycloalkanes**
2. **Aromatic Rings**

Cycloalkanes

- Carbon atoms may bond to each other and form a cyclic structure



becomes 

- General Formula: C_nH_{2n}

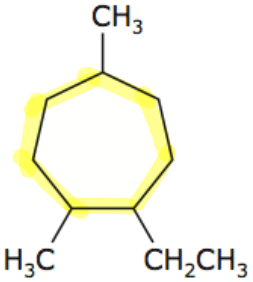
# of C Atoms	Prefix	Cycloalkane	Formula
1	Meth-	not possible	
2	Eth-	not possible	
3	Prop-	cyclopropane	C_3H_6
4	But-	cyclobutane	C_4H_8
5	Pent-	cyclopentane	C_5H_{10}
6	Hex-	cyclohexane	C_6H_{12}
7	Hept-	cycloheptane	C_7H_{14}
8	Oct-	cyclooctane	C_8H_{16}
9	Non-	cyclononane	C_9H_{18}
10	Dec-	cyclodecane	$C_{10}H_{20}$

Steps to Naming Cycloalkanes:

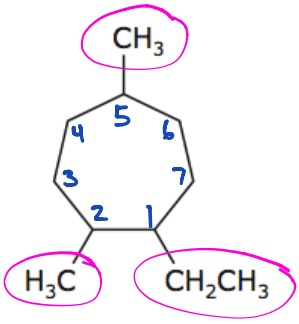
1. The ring that contains the greatest number of carbon atoms is the parent chain

- The prefix "cyclo" is placed in front of the parent chain name.

Parent Chain = Cycloheptane

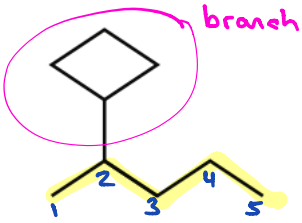


2. The carbon atoms are numbered either clockwise or counter-clockwise.
   - The lowest numbers are used to identify the placement of branches



3. Name the branches
   1-ethyl
   2,5-dimethyl
4. Name the compound
   1-ethyl-2,5-dimethylcycloheptane

If the ring structure is not the longest continuous carbon chain, then it is named as a branch with prefix "cyclo" and ends in "yl."

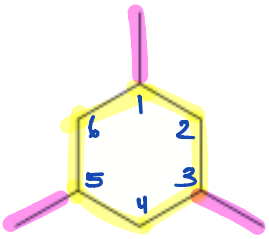


Parent: pentane

Branch: 2-cyclobutyl

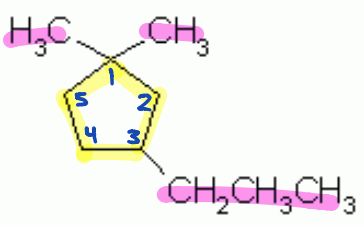
Compound: 2-cyclobutylpentane

Practice #1.



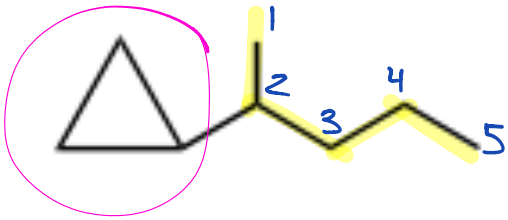
1. Parent Chain.
   cyclohexane
2. Number the parent chain.
3. Name the branches.
   1,3,5-trimethyl
4. Name the compound
   1,3,5-trimethylcyclohexane

Practice #2.



1. Parent Chain.
   cyclopentane
2. Number the parent chain.
3. Name the branches.
   1,1-dimethyl
   3-propyl
4. Name the compound
   1,1-dimethyl-3-propylcyclopentane

Practice #3.



1. Parent Chain.

   pentane

2. Number the parent chain.

3. Name the branches.

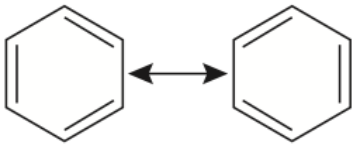
   2-cyclopropyl

4. Name the compound

   2-cyclopropylpentane

Aromatic Rings

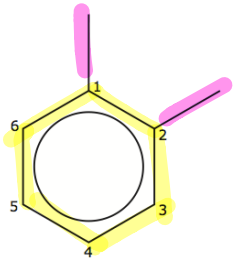
- An aromatic hydrocarbon, or benzene, is a hydrocarbon with six carbon atoms in a ring
- It has the molecular formula C_6H_6
- The electrons in a benzene molecule are spread out across multiple atoms, so there is more than one way to draw its Lewis structure
- Equivalent lewis structures are called resonance structures



can also be drawn as 

Steps to Naming Aromatic Rings:

- Same as other naming procedures! Except... parent chain is called: benzene

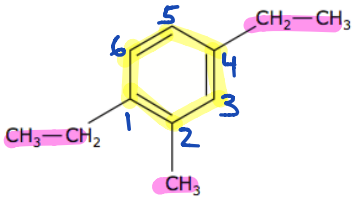


1,2-dimethylbenzene

Some organic compounds have benzene as a branch.

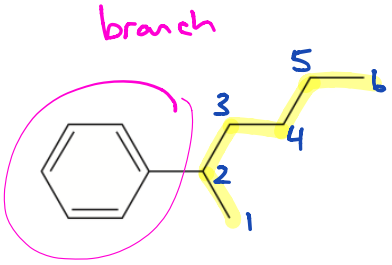
In this case, the branch name is "phenyl**"**

Practice #1.



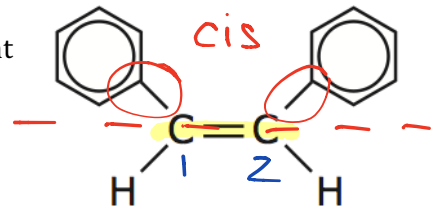
1. Parent Chain.
   benzene
2. Number the parent chain.
3. Name the branches.
   1,4-diethyl
   2-methyl
4. Name the compound
   1,4-diethyl-2-methylbenzene

Practice #2.



1. Parent Chain.
   hexane
2. Number the parent chain.
3. Name the branches.
   2-phenyl
4. Name the compound
   2-phenylhexane

Practice #3.



1. Parent Chain. (remember alkene and alkyne will be main parent chain)
   cis-ethene
2. Number the parent chain.
3. Name the branches.
   1,2-diphenyl
4. Name the compound
   cis-1,2-diphenylethene
   the "1" is redundant