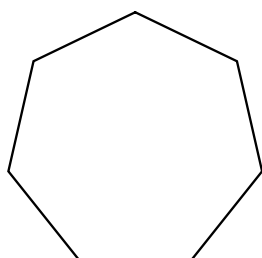


Chem Unit 7.3 Notes - Cyclic Hydrocarbons

7.3 - Cyclic Hydrocarbons



cycloheptane


Cyclic Hydrocarbons


Hydrocarbons form rings.


Count carbons in parent ring to determine name.

Add *cyclo-* prefix (no numbers needed yet).

1. Guided Examples

A: 6 carbon (single bonds)  → cyclohexane

B: 8 carbon (1 double bond)  → cyclooctene

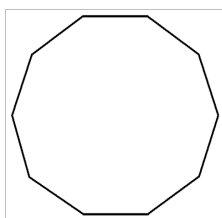
C: 5 carbon (1 triple bond)  → cyclopentyne.

2. Guided Example

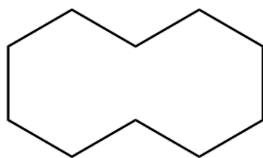
A. Draw cyclodecane.

Dec- prefix = 10 carbon atoms.

-ane ending = single bonds.



OR:



2. Guided Example

B. Name the following molecule: 

4 cyclic carbon atoms: prefix = *but-*

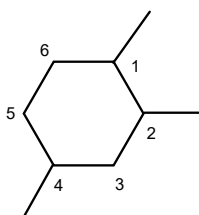
One double bond: *-ene* ending.

Answer: cyclobutene

(Note: if no number is written, assume the double bond is on the first carbon)

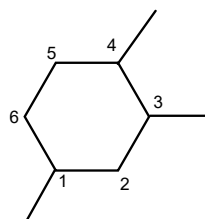
Naming Branched Alkane Rings

Count and number carbon in ring to yield the lowest possible number set.



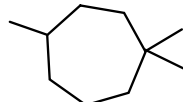
1,2,4-trimethylcyclohexane

NOT



1,3,4-trimethylcyclohexane

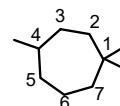
3. Example

Name this molecule: 

Carbon atoms in ring:
7 = cycloheptane.

1st carbon has two methyl groups; 4th has one.

Name = 1,1,4-trimethylcycloheptane.



Chem Unit 7.3 Notes - Cyclic Hydrocarbons

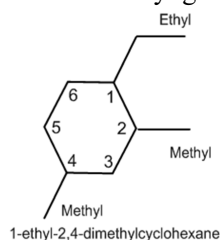
4. Example

Draw 1-ethyl-2,4-dimethylcyclohexane

cyclohexane → 6 carbon ring - single bonds

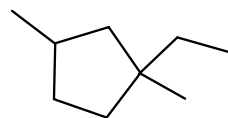
Position 1 → ethyl group

Positions 2 and 4 → methyl groups.



5. Another Example

Name this molecule,
and determine its
formula:



1-ethyl-1,3-dimethylcyclopentane



Naming Alkene/-yne Rings

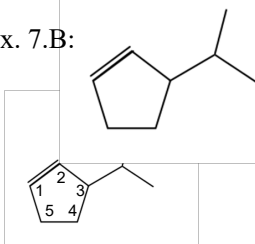
Number carbon so 1st is located at multiple bond.

Name this - See Next Page, Ex. 7.B:

5 carbon ring: 1 double bond
→ 1-cyclopentene

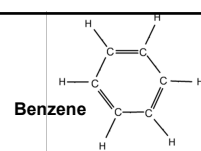
Isopropyl group at 3rd.

Name → 3-isopropyl-1-cyclopentene



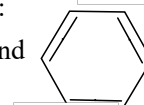
Aromatic Compounds

Many organic compounds
contain benzene (C_6H_6) rings.

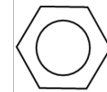


A benzene ring can be shown as:

1. A ring of alternating double and
single bonded carbon atoms:



2. A hexagon with an inscribed
circle representing resonance.



Draw any of these for the Benzene Challenge.

Naming Aromatics

Number the carbon atoms in ring to give the lowest
numbers possible.

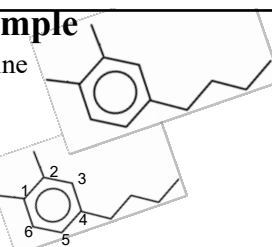
End with *-benzene*. (Never **cyclo**benzene)

Formula Shortcut: C_nH_{2n-6}

6. Benzene Example

Name this, and determine
the formula:

Number carbon atoms:



2 methyl groups on 1st & 2nd, and butyl group at # 4.

4-butyl-1,2-dimethylbenzene.

Formula: $C_{12}H_{18}$

Chem Unit 7.3 Notes - Cyclic Hydrocarbons

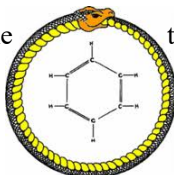
Some Lore 4 U

Benzene was isolated in 1825 by Michael Faraday; had the formula C_6H_6 .

Chemists realized it must have both single and double bonds, but could not determine the structure: it wasn't reactive like other double bonded organic molecules.

Finally, in 1865, Friedrich Kekulé proposed a ring structure.

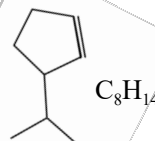
He claimed it came to him in a dream: Ouroboros, an ancient Egyptian snake emblem, was swallowing its own tail, and he



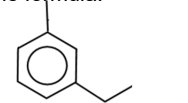
to him in a dream: an ancient Egyptian was swallowing its own tail, and he saw the structure.

7. Examples!

A. What is this molecule's formula?

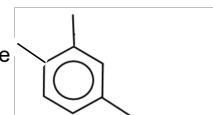


C. Name and determine the formula:



1-ethyl-3-methylbenzene
 C_9H_{12}

B. Draw 1,2,4-trimethylbenzene



Homework

7.3 Problems in your Booklet
Due next class.