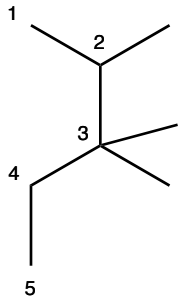
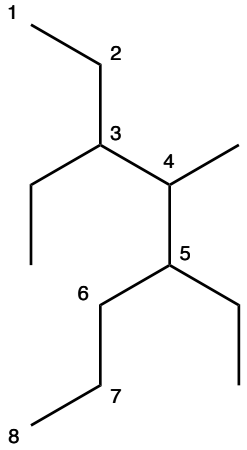
Review Naming Nomenclature



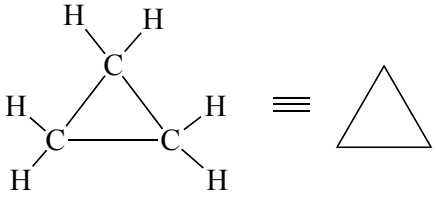
2,3,3-trimethylpentane



3,5-diethyl-4-methyloctane

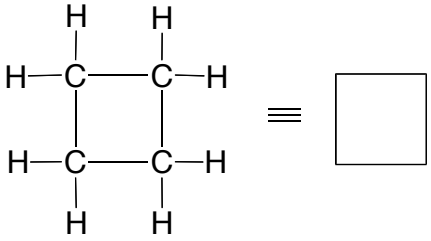
CYCLOALKANE

Cyclopropane, C_3H_6

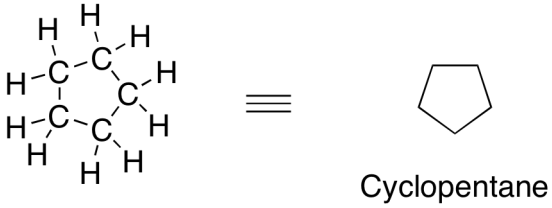


- One degree of unsaturation (n-propane is C_3H_8)
- C-C-C bond angle (60 ^{o})
- Highly reactive due to ring strain

Cyclobutane, C_4H_8

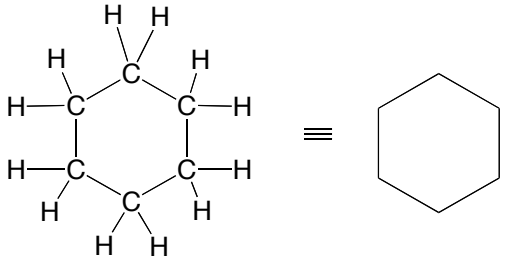


Cyclopentane, C_5H_{10}



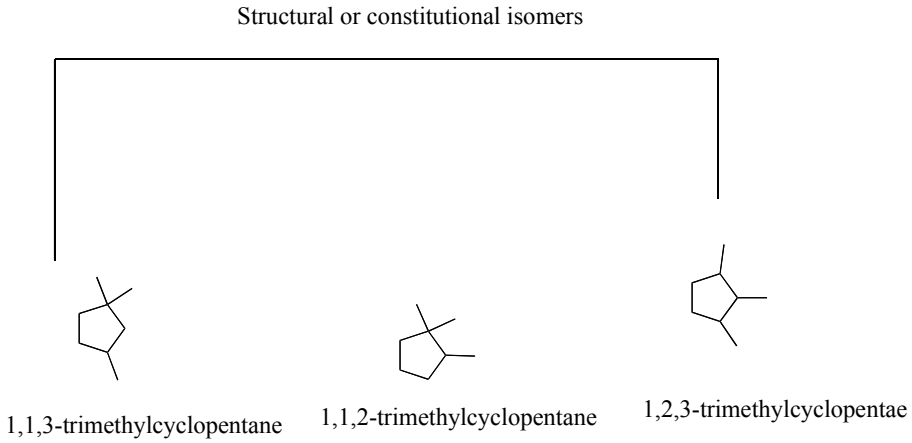
Cyclopentane

Cyclohexane, C_6H_{12}

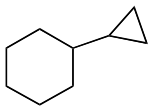


ISOMERS

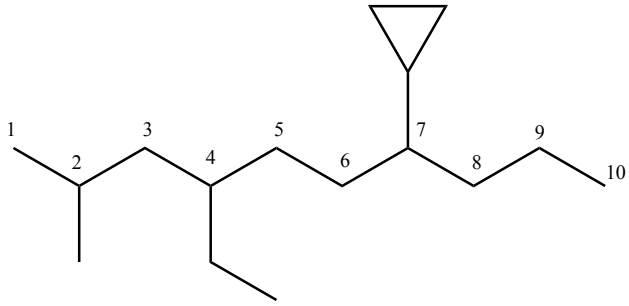
Example: 1,1,3-trimethylcyclopentane



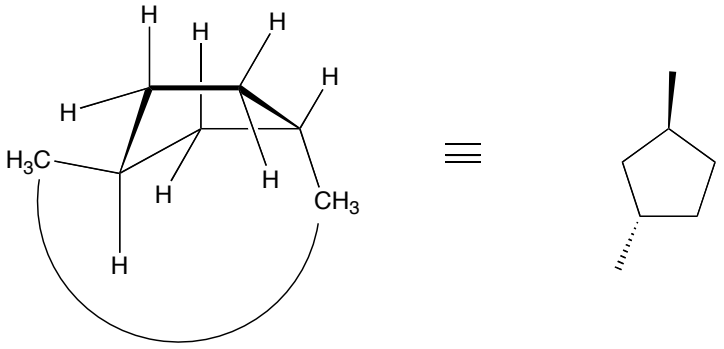
Prefixes
2 – di
3 – tri
4 – tetra
5 – penta
6 – hexa
7 – hepta
etc.



1-Cyclopropylcyclohexane



7-cyclopropyl-4-ethyl-2-methyldecane



Trans-1,3-dimethylcyclopentane

Trans to each other

TRANS : OPPOSITE
CIS : SAME

Stereoisomers

Cis-1,3-dimethylcyclopentane

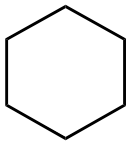
Trans-1,3-dimethylcyclopentane

STEREOISOMERS: Different arrangement of atoms in 3-Dimensional space

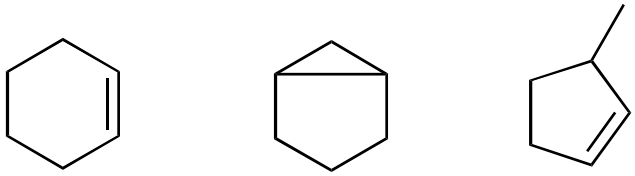
General Molecular Formula of Alkanes

- No rings: general formula is C_NH_{2N+2}
- Each deviation of 2 hydrogens from the C_NH_{2N+2} formula is a **degree of unsaturation**
- 1 Degree of unsaturation : C_NH_{2N} Alkanes with one ring or double bond
- 2 Degrees of unsaturation : C_NH_{2N-2} Alkanes with two rings or double bonds, or one each

Examples

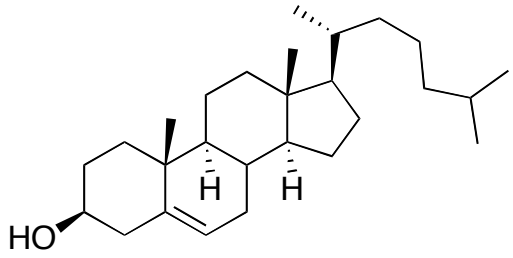


C_6H_{12} 1 degree of unsaturation



C_6H_{10} 2 Degrees of unsaturation

The above three are structural (constitutional) isomers



Cholesterol

Ideal formula for straight chain alkane-alcohol would be $C_{27}H_{56}O$

Cholesterol has 5 Degrees of unsaturation = (4 rings and 1 double bond)
1 degree of unsaturation we remove 2 hydrogens so 10 hydrogens must be removed from the ideal formula to give the actual molecular formula (MF) of cholesterol.

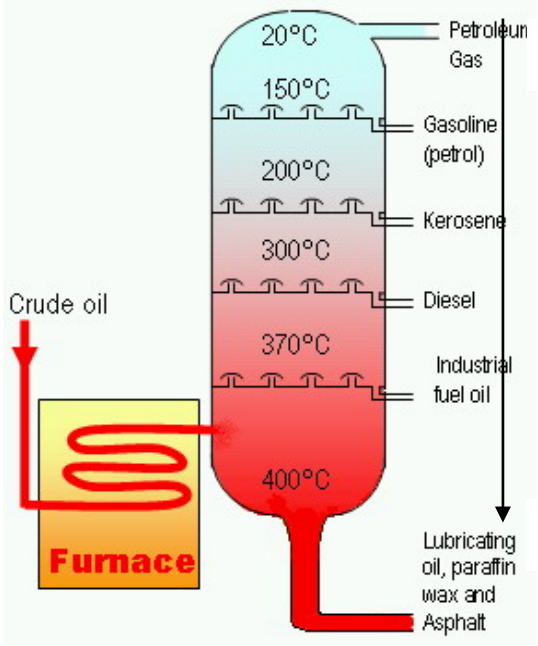
(2 x 27) + 2 = 56
56 – 10 = 46 hydrogen atoms

Actual MF = $C_{27}H_{46}O$

Source of Hydrocarbons

- Petroleum *(John D. Rockefeller)*

Distillation of Petroleum:



Low Temperatures

High Temperatures

- Petroleum is a mixture of alkanes and other hydrocarbons (>>200 compounds)