Exam 2 Test Prep

IUPAC Naming

Naming Alkanes:

Number of C atoms	Formula	Name
1	CH_4	methane
2	C_2H_6	ethane
3	C_3H_8	propane
4	C_4H_{10}	butane
5	C_5H_{12}	pentane
6	C_6H_{14}	hexane
7	C_7H_{16}	heptane
8	C_8H_{18}	octane
9	C_9H_{20}	nonane
10	$C_{10}H_{22}$	decane

1. If there is a competition of numbering chains of an equal length, number so that you get the _____amount of substituents

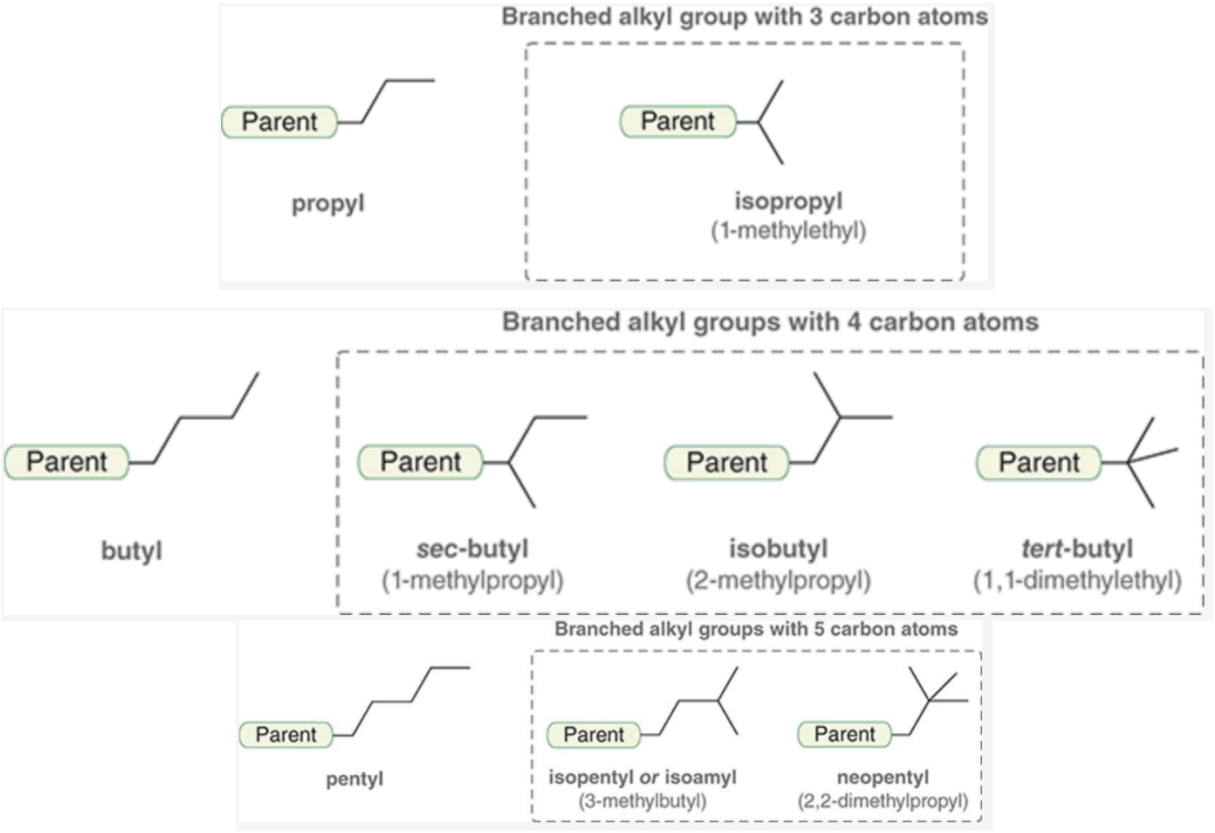
2. Use _____ to indicate a ring

3. To name alkyl substituents_____+_____

4. Number the parent chain and assign substituents the _____number possible according to IUPAC rules

5. To put names together, _____ substituents and combine using _____

Common names of alkyl groups (memorize)



When a substituent appears more than once in a molecule:

# of functional groups:	Prefix:
2	Di-
3	Tri-
4	Tetra-
5	Penta-
6	Hexa-

Naming Alkyl Halides

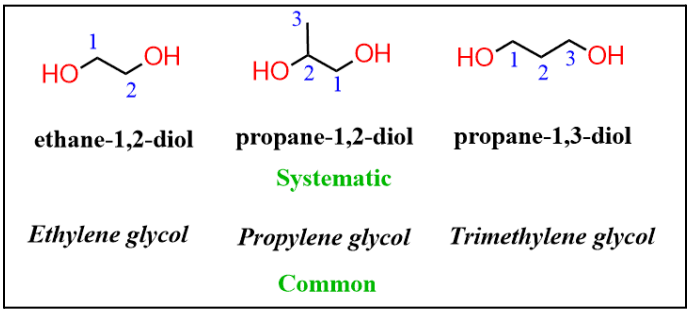
1. Halogen is treated as a _____

Naming Alcohols

1. Number the chain that includes the _____ group
2. Ends in _____
3. Alcohol gets_____(for the purposes of this class)

Naming Diols

1. Similar to alcohols just make sure you indicate the prefix of multiple alcohols
2. Remember the _____ of basic diols



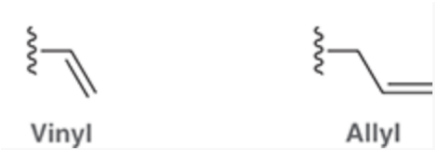
Bicyclic Compounds

1. Find total _____
2. Use _____
3. Find _____
4. Order paths going_____

Naming Alkenes

1. Ends in _____
2. Use the longest chain that _____
3. Pi bond is assigned _____

Allyl and Vinyl groups



Naming Alkynes

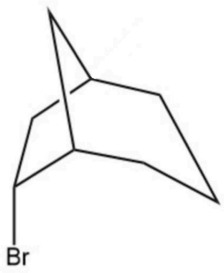
1. Use _____
2. The triple bond should be assigned _____

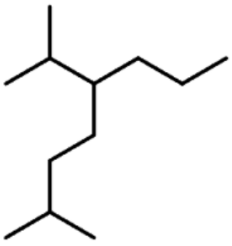
Alkenes and Alkynes: Which Takes Priority?

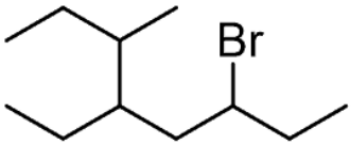
A molecule containing an alkene and alkyne with *no* higher-ranking substituents

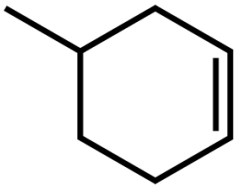
- will be **numbered** so as to provide the lowest set of locants
- will be **named** so as to arrange the ene/yne **alphabetically**

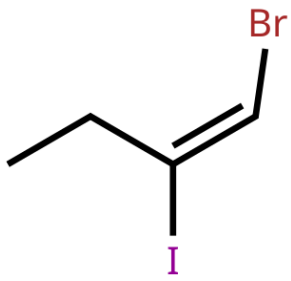
Practice

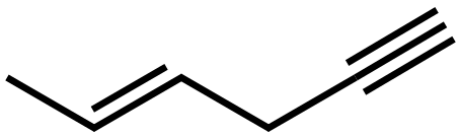


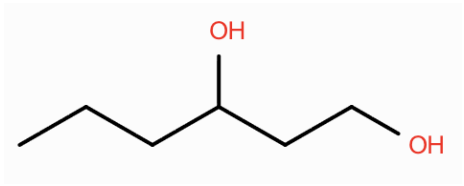


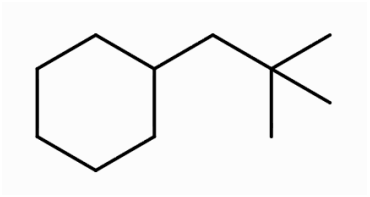





Br
I




OH
OH



Newman Projections
A bird's eye view of the molecule!

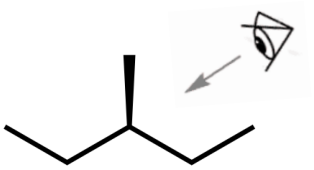
Steps to creating a Newman Projection:

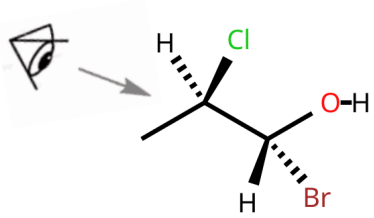
1.

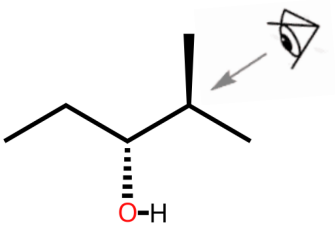
2.

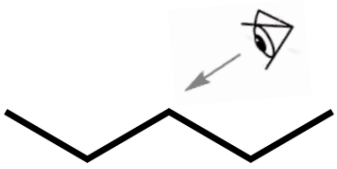
3.

Practice: draw the Newman projection for the following bond line structures

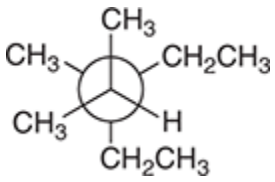


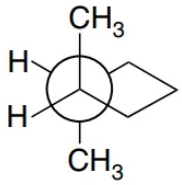


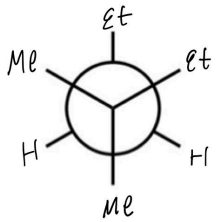


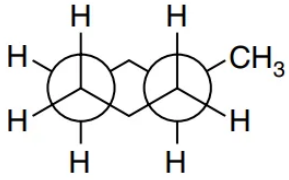


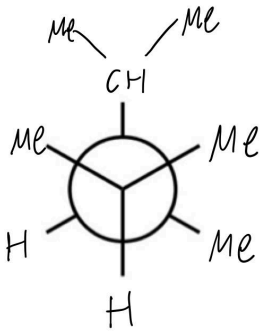
Practice: draw and name the bond line structure given the Newman projection

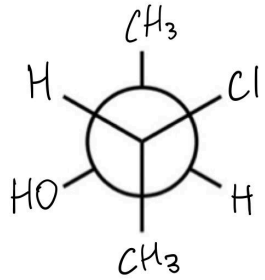






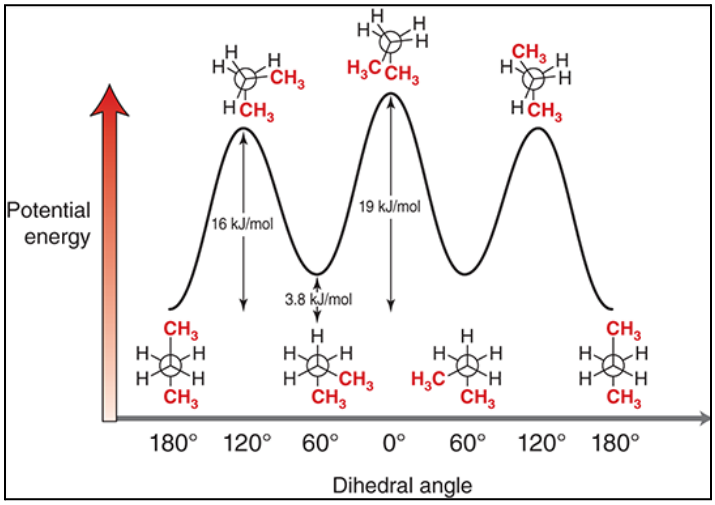




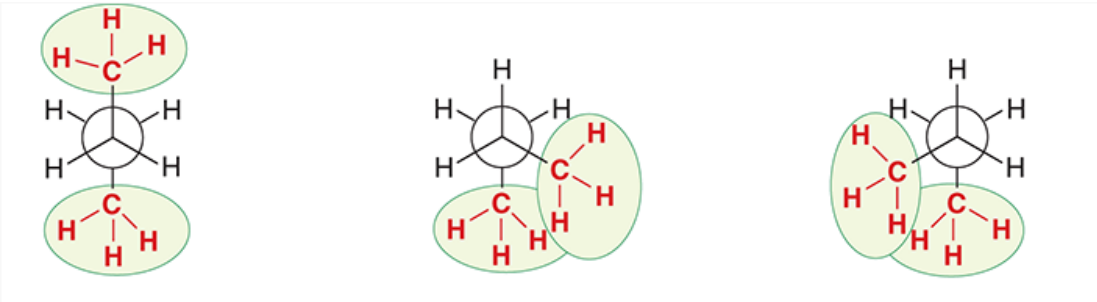


Stability of Newman projections:

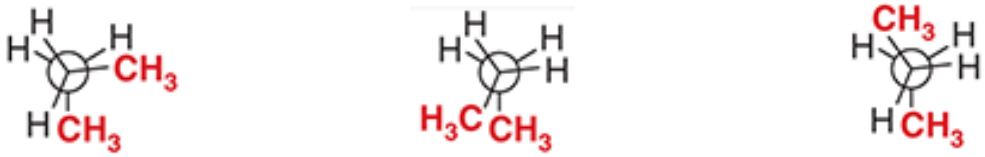
Conformation analysis of butane



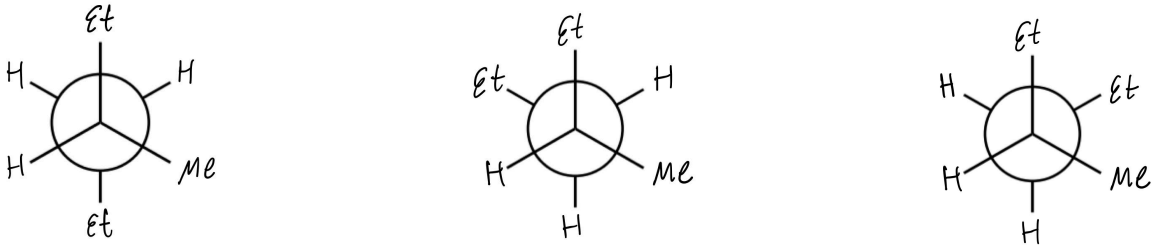
Staggered Conformations:

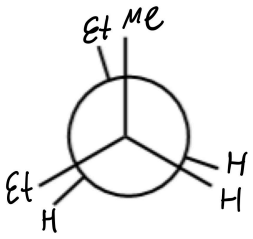


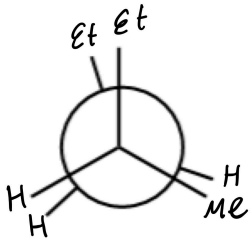
Eclipsed Conformations:

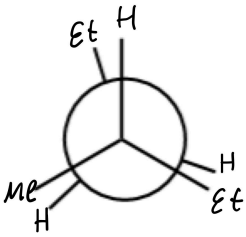


Practice: Which of the projections is higher in energy? Lower?



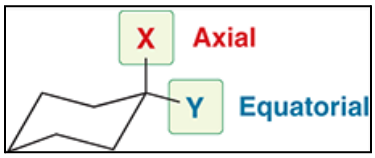


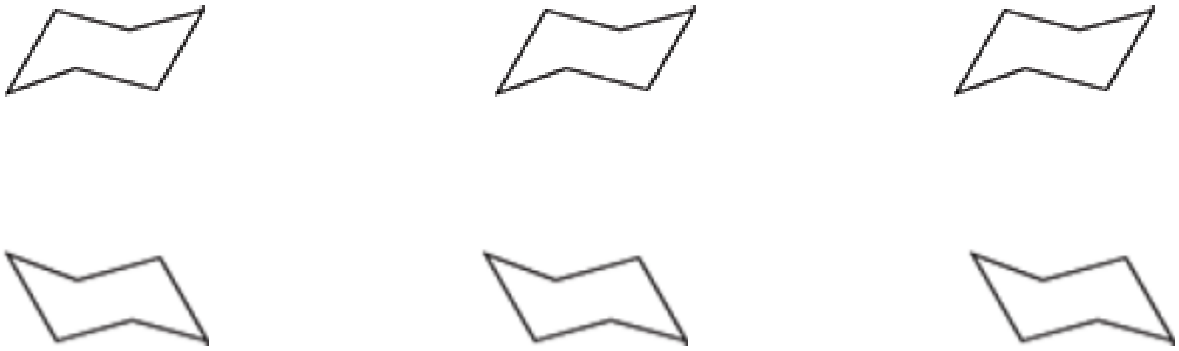




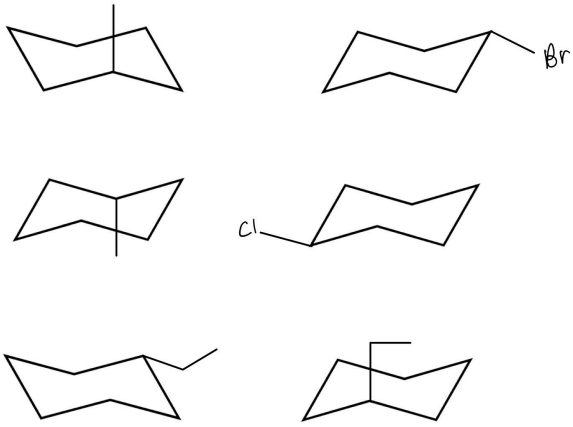
Conformations of Cycloalkanes

Axial and Equatorial:

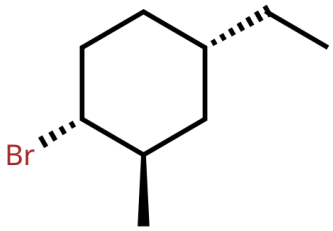


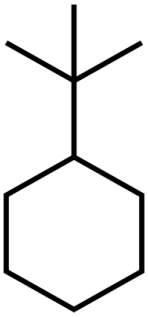


Label the substituents as axial or equatorial

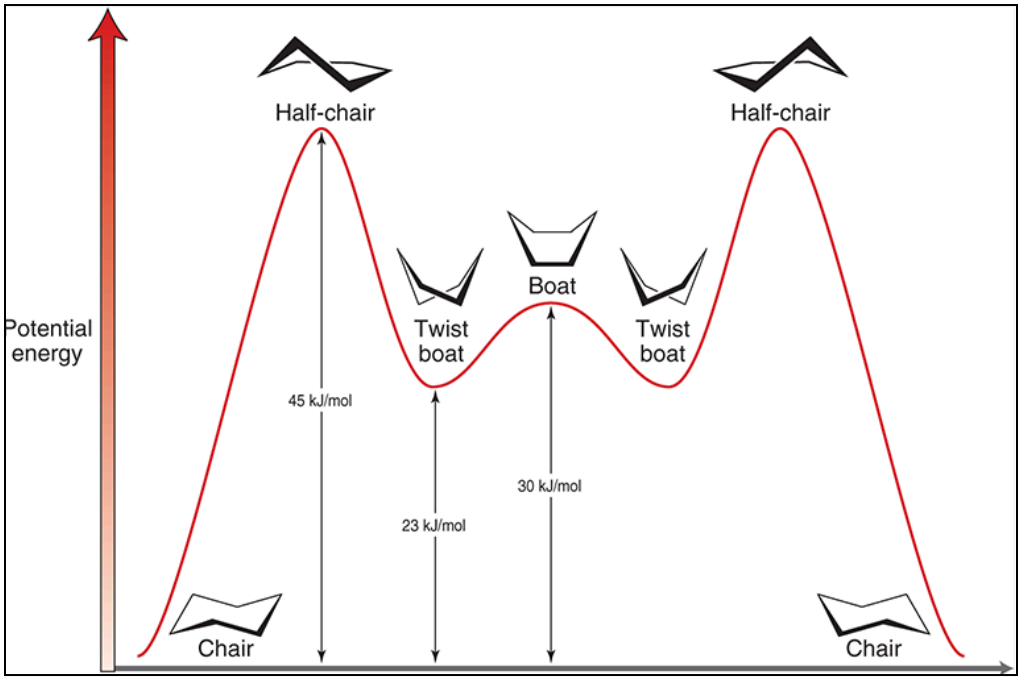


Draw the ring flip for the following compounds and identify which one is more/less stable:



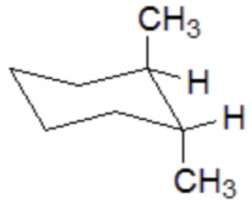
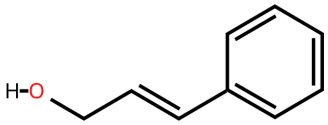
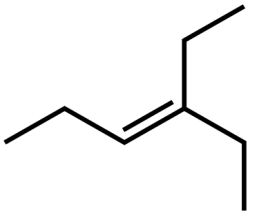
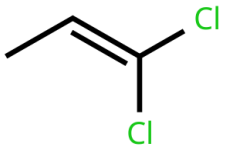
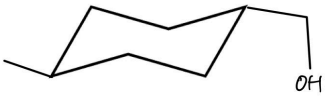


Review: Stability of chair conformations:



Cis/Trans Isomerism

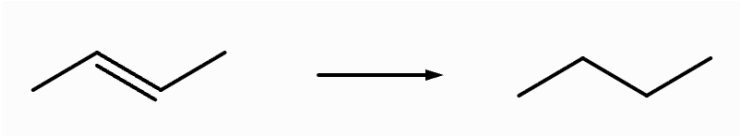
Identify if the following compounds are cis, trans, or nonisomeric (neither):

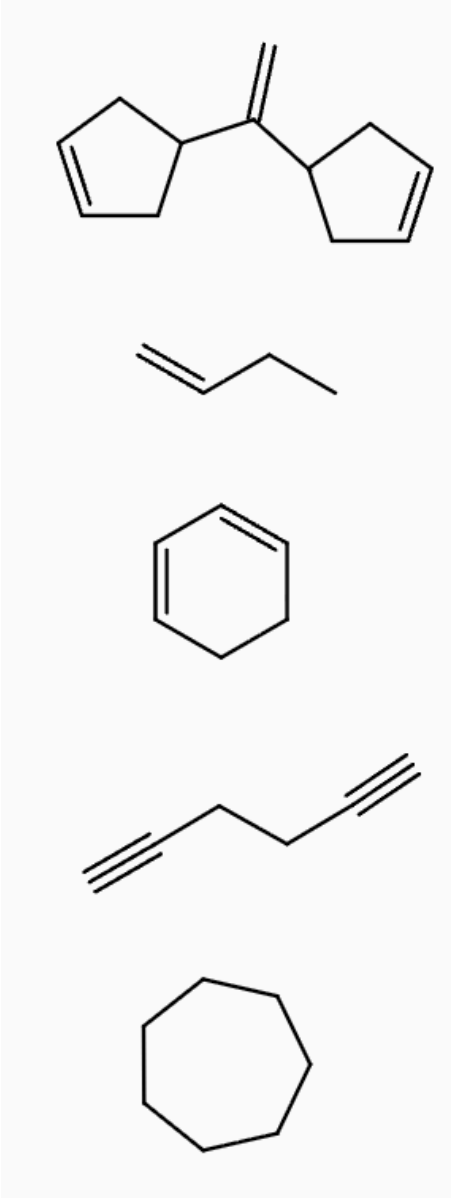
Index of Hydrogen Deficiency

Type of Bonding	IHD Value
Single bond	
Pi bond	
Ring	

What is the name of the reaction that can increase the IHD value? What elements does it use?

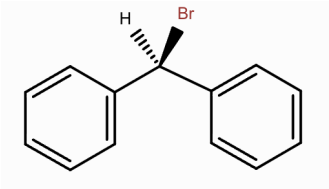


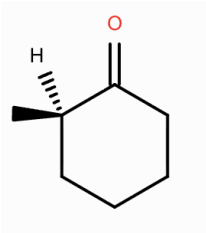
Identify the IHD value of the following compounds:

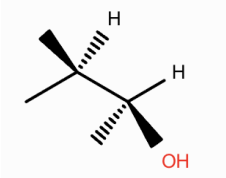


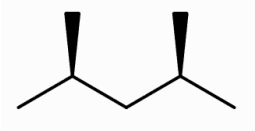
Stereochemistry

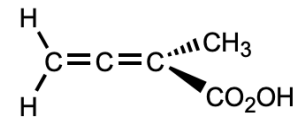
Are the following compounds chiral or achiral? If it is chiral, what is the configuration?



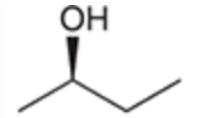




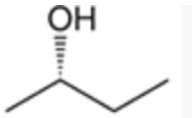




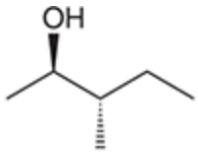
Chirality in IUPAC:



(*R*)-2-Butanol

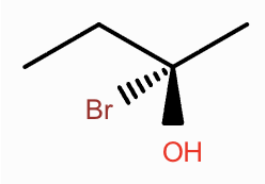


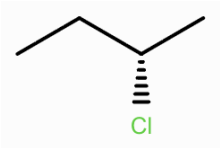
(*S*)-2-Butanol

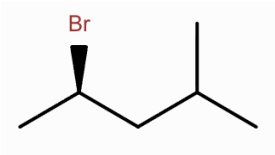


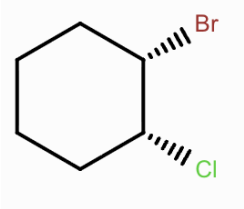
(2*R*,3*S*)-3-Methyl-2-pentanol

Name the structure and include the chirality:









Draw the strucuture given the name:

(1R, 2R)-1-bromo-2-chlorocyclobutane

(S)-1-bromo-1-chloropropane

(2R,3S)-2,3-dichloropentane

Racemic Mixture:

Optically Pure:

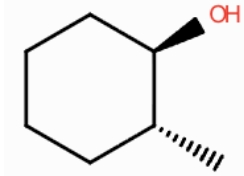
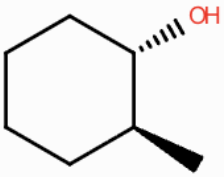
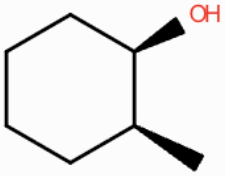
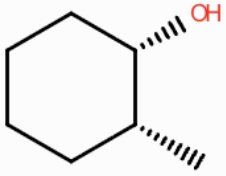
Enantiomers:

Diasteriomers:

T/F: Enantiomers have the same physical properties(boiling point, melting point and density), but diastereomers have different physical properties

A. True
B. False

Looking at the compounds below, identify the relationship of:

1	2	3	4
			

1+2:_____

1+3:_____

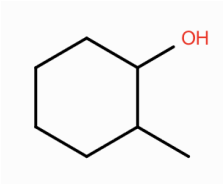
1+4:_____

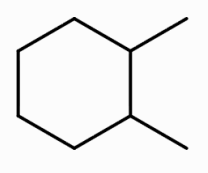
2+3:_____

2+4:_____

3+4:_____

Calculating the maximum # of stereoisomers (be careful)





The method of determining which enantiomer was yielded in a reaction is:

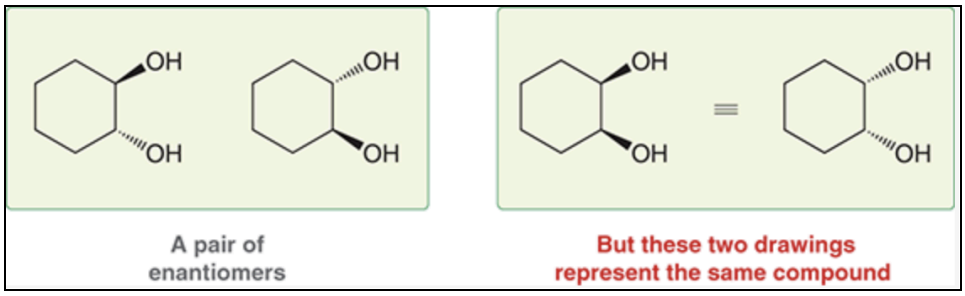
A. IR Spectroscopy
B. H-NMR
C. Polarimetry
D. Blow it up
E. C-NMR

Meso Compounds

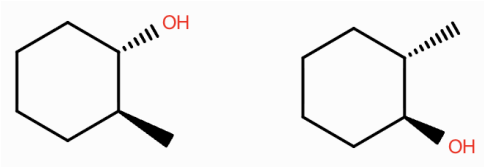
They have _____

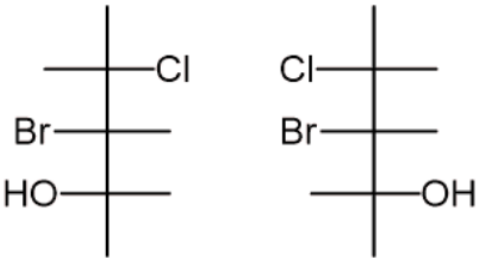
Their chiral centers are _____

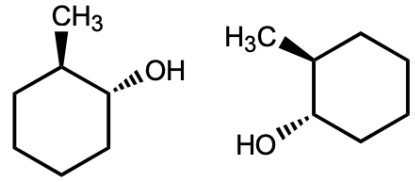
Example

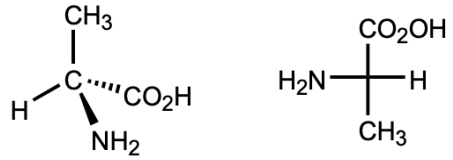


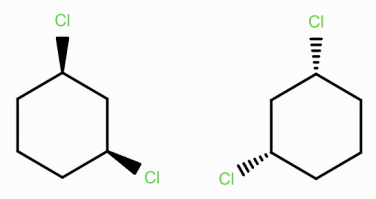
Identify the relationship of the following compounds as Meso, Enantiomer, Diasteriomer, or the same compound:

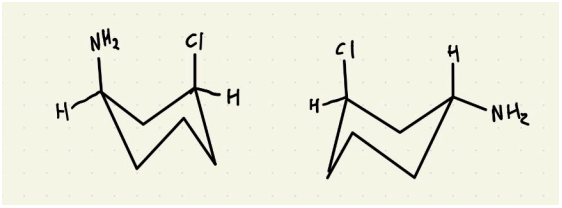




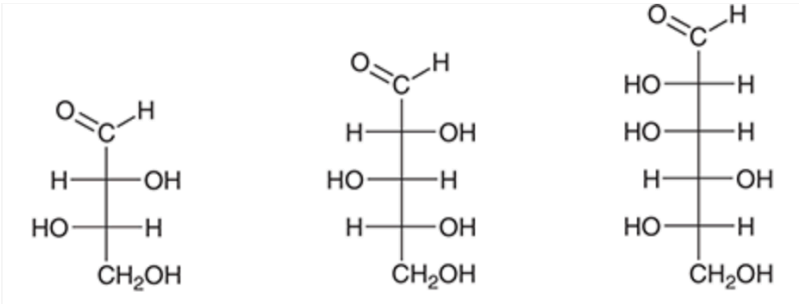








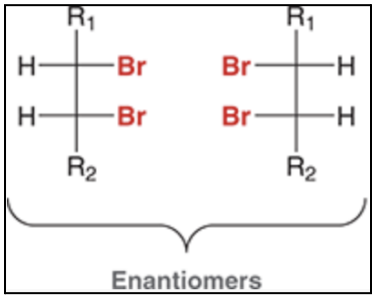
Fischer Projections

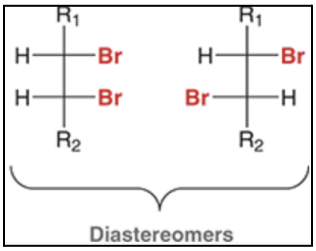


Horizontal Line =

Vertical Line =

Example:





Assigning configuration of fischer projections

Draw one horizontal line as a_____

Draw one vertical line as a _____

Practice: Assigning the configuration of the Fischer projection: