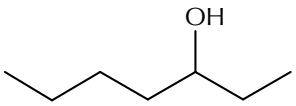
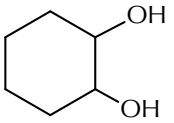
Figure AP0217

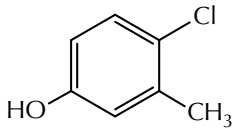
Naming alcohols.



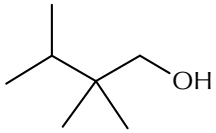
heptan-3-ol
(3-heptanol)



cyclohexane-1,2-diol
(1,2-cyclohexanediol)



4-chloro-3-methylphenol



2,2,3-trimethylbutan-1-ol
(2,2,3-trimethyl-1-butanol)

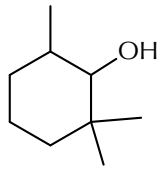
Although no prioritization for numbering exists for the prefix-designated substituent groups (methyl-, ethyl-, propyl-, phenyl-, chloro-, bromo-, etc., all use first point of difference), the IUPAC rules give suffix-designated substituent groups (so far, -ol) a higher priority for numbering than prefix-designated substituent groups.

When a molecule has both prefix- and suffix-designated groups, then the first attempt at numbering is based upon giving the suffix-designated group(s) the lowest point of difference and ignoring the prefix-designated groups completely in the numbering process.

If a decision based on the suffix-designated group can be made, then that fixes the numbering of the root chain. In the event of a numbering tie based upon the suffix group, then the previously used point-of-difference process for the prefix groups is used to break the suffix tie. And if that fails, then the alphabetical order tie-breaker is used (Figure 0218).

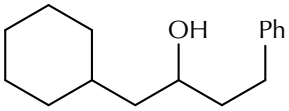
Figure AP0218

Naming compounds that need the substituent priority ordering for numbering.



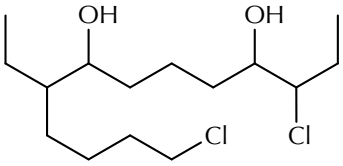
2,2,6-trimethylcyclohexan-1-ol
(2,2,6-trimethylcyclohexanol)
(2,2,6-trimethyl-1-cyclohexanol)

of note: the OH group defines carbon-1, and point of difference dictates how to number the rest of the ring (1,2,2…) versus (1,2,6…)



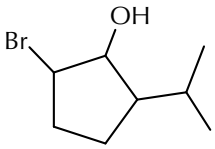
1-cyclohexyl-4-phenylbutan-2-ol
(1-cyclohexyl-4-phenyl-2-butanol)

of note: the OH group defines carbon-2 on the butane root chain containing 3 substituents



3,13-dichloro-9-ethyltridecane-4,8-diol
(3,13-dichloro-9-ethyl-4,8-tridecanediol)

of note: the two OH groups defines carbons 4 and 8 of the 13-carbon root chain



2-bromo-5-isopropylcyclopentan-1-ol
(2-bromo-5-isopropyl-1-cyclopentanol)

of note: the OH group defines carbon-1, and point of difference creates a (1,2,5-) versus (1,2,5-) tie, so the alphabetal order of bromo > isopropyl defines the numbering

In summary, there is a priority order for deciding which end of the root chain to start from for numbering: suffix groups (using point of difference) > prefix groups (using point of difference) > alphabetical order.

This is not the final set of priority rules that you will need. Looking ahead: (1) a molecule can only have one suffix-designated substituent group, so that situation will need to be resolved; and (2) some groups appear in the root chain itself (double bonds, triple bonds, heteroatoms), and so there are chain-designated groups, also. The rules for these situations appear in other appendixes.