

Advanced IUPAC Nomenclature XI

Amines

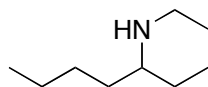
Amines:

- Amines have the general group $R-NH_2$. They are polar, moderately water soluble, and good bases. They get higher priority than alkanes, but lower priority than everything else. A primary amine is a $R-NH_2$, a secondary amine is a R_2-NH , a tertiary amine is R_3N and a quaternary ammonium ion is R_4N^+ .
- IUPAC Nomenclature of amines follows these steps:
 - 1) Find the longest chain of continuous carbons that includes the **carbon** attached to the *amine*. This is now the main chain. Name this chain as if it were a straight chain alkane.
 - a. Drop the $-e$ ending and add $-amine$. This works for $-enes$ and $-ynes$ as well.
 - b. Count the carbons in the main chain left to right and right to left. The direction you *first* run into the carbon attached to the *amine* is the direction used to number the chain.
 - a. If the numbers are the same use alphabetical order of the other halogen/alkyl substituents.
 - 2) Give each substituent a number according to which carbon it's attached to. Additional alkyls on the nitrogen are labeled as *N*-alkyl groups.
 - 3) List the substituents in alphabetical order in front of the main chain as you would in an alkane.
 - a. Alkenes and alkynes are always listed as $-ene$ or $-yne$ at the end of the name.
 - 4) Multiple substituents of the same kind are combined and given a prefix to indicate the number. (di-, tri-, tetra-) these prefixes do not count towards alphabetical order unless they are part of a branched substituent.
 - 5) List any relevant stereochemistry (*R,S,E,Z*) in parenthesis in front of the substituents. Stereochemistry is italicized.

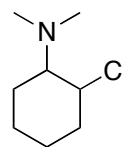
Notes:

- If any functional group is present besides halogen, ether, or hydrocarbons the amine will be a substituent.
- Amines as substituents are *amino-* groups.
- Alkyl amines as substituents are *N-alkylamino-* groups.

Examples:

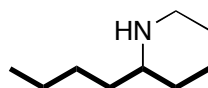


Compound A

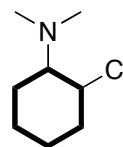


Compound B

1)

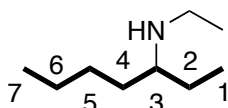


a heptane

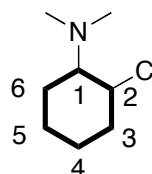


a cyclohexane

2)

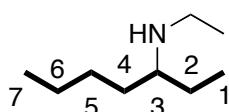


The amine is the only functional group so we name this as an amine. Counting R-->L gives a 3-amine rather than a 5-amine counting L-->R so our main chain is numbered.

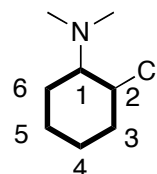


The amine is the same priority as the chloro substituent. Since amine is first in alphabetical order we number the ring clockwise.

3)



N-ethyl



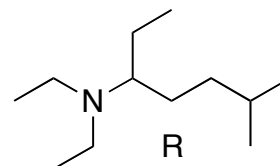
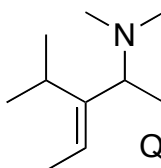
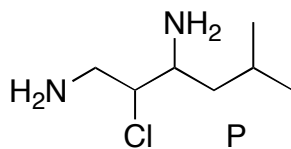
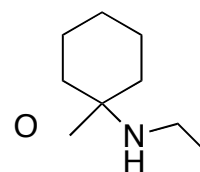
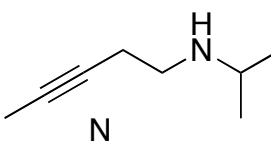
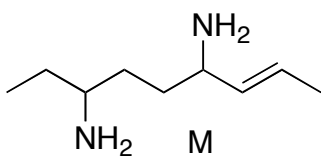
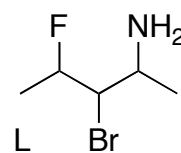
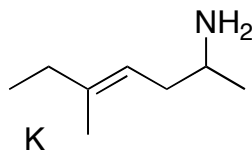
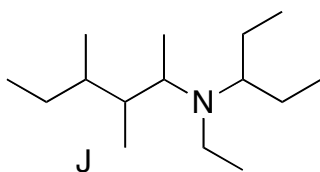
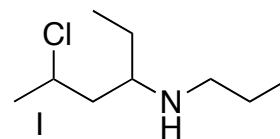
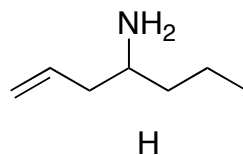
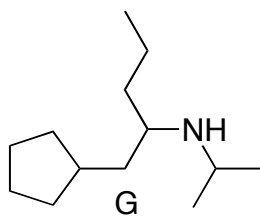
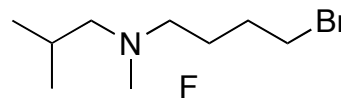
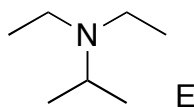
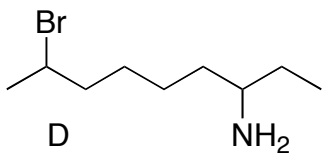
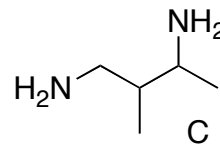
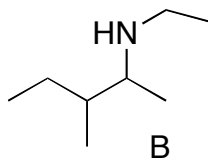
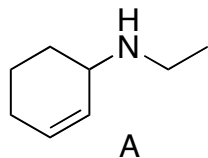
N-methyl
N-methyl
2-chloro

4,5,6)

N-ethyl-3-heptanamine

2-chloro-*N,N*-dimethylcyclohexanamine

Practice Amine Nomenclature:



Practice Amine Nomenclature Key:

Compound A:	(3Z)-1- <i>N</i> -ethylamino-3-cyclohexene
Compound B:	<i>N</i> -ethyl-3-methyl-2-pentanamine
Compound C:	2-methyl-1,3-butanediamine
Compound D:	2-bromo-7-nonanamine
Compound E:	<i>N,N</i> -diethyl-2-propanamine
Compound F:	4-bromo- <i>N</i> -isobutyl- <i>N</i> -methyl-1-butanamine or 4-bromo- <i>N</i> -methyl- <i>N</i> -(2-methylpropyl)-1-butanamine
Compound G:	1-cyclopentyl- <i>N</i> -isopropyl-2-pentanamine or 1-cyclopentyl- <i>N</i> -methylethyl-2-pentanamine
Compound H:	hept-1-en-4-amine
Compound I:	2-chloro- <i>N</i> -propyl-4-hexanamine
Compound J:	<i>N</i> -ethyl- <i>N</i> -(1-ethylpropyl)-3,4-dimethyl-2-hexanamine
Compound K:	(4 <i>E</i>)-5-methylhept-4-en-2-amine
Compound L:	3-bromo-4-fluoro-2-pentanamine
Compound M:	(7 <i>E</i>)-non-7-ene-3,6-diamine or <i>trans</i> -non-7-ene-3,6-diamine
Compound N:	<i>N</i> -isopropylpent-3-yn-1-amine or <i>N</i> -methylethylpent-2-yn-5-amine
Compound O:	<i>N</i> -ethyl-1-methylcyclohexanamine
Compound P:	2-chloro-5-methyl-1,3-hexanediamine
Compound Q:	<i>N,N</i> -dimethyl-3-methylethylpent-3-en-2-amine or 3-isopropyl- <i>N,N</i> -dimethylpent-3-en-2-amine
Compound R:	<i>N,N</i> -diethyl-6-methyl-3-heptanamine