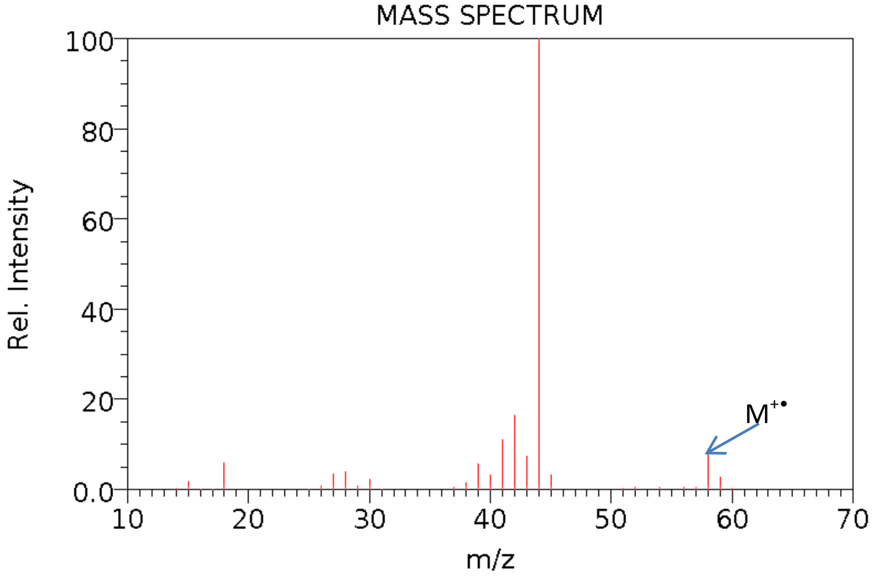
Chemistry 3.2 **Worksheet 2** Name ____________

Compound B is a primary amine

a) The mass spectrum for compound B is given below



a. Use the mass spectrum to work out the molar mass of compound B and hence workout the molecular formula. Justify your answer

The $M^{+\bullet}$ has a mass of 59. This indicates that there is an odd number of nitrogen atom(s) present in the molecule.

59 – (14 + 2) = 43 m/z

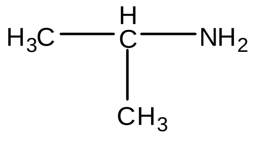
I would predict that there are 3 carbon atoms and 7 hydrogen atoms added on top of the NH_2

Therefore the molecular formula would be C_3H_9N

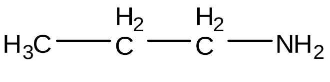
b. Explain the most likely reason for peak at 44 m/z

59 – 44 = 15, this corresponds to CH3 group. Therefore there may be a CH_3 branch in the molecule

b) Compound B has 2 possible isomers. Draw the two possible isomers

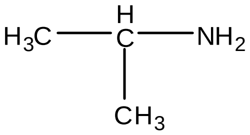


$H_3C-\underset{CH_3}{\overset{H}{C}}-NH_2$



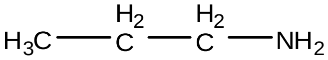
$H_3C-\overset{H_2}{C}-\overset{H_2}{C}-NH_2$

a. Determine the number of carbon environments for each of these isomers



$H_3C-CH(NH_2)-CH_3$

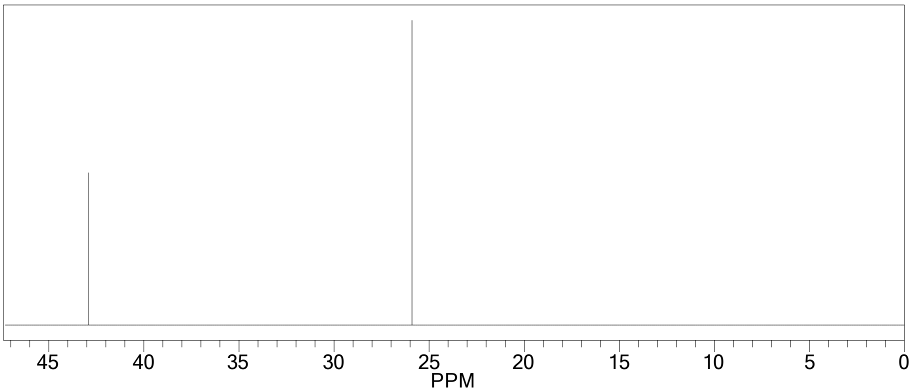
2 carbon environments



$H_3C-CH_2-CH_2-NH_2$

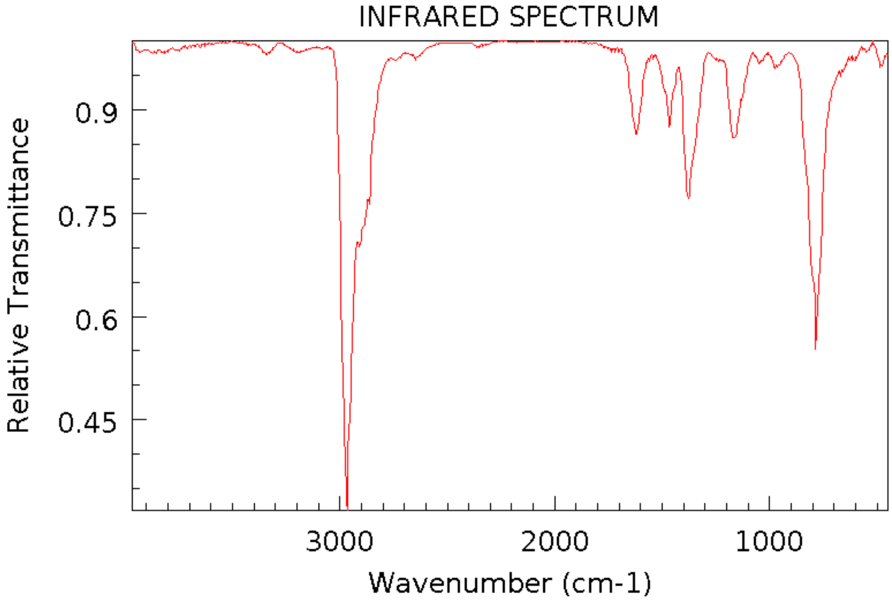
3 carbon environments

b. The ^{13}C NMR spectrum for compound B is given below. Identify which of structure above matches that compound B



Since there are only two peaks on the ^{13}C NMR spectrum, therefore the molecule would be 2-amino propane

c. The IR spectrum of Compound B is shown below.



Mr Yung thinks there is something wrong with this spectrum; discuss why Mr Yung would think that.

There should be a peak appear around the 3500 – 3100 cm^{-1} region due to the N-H bond