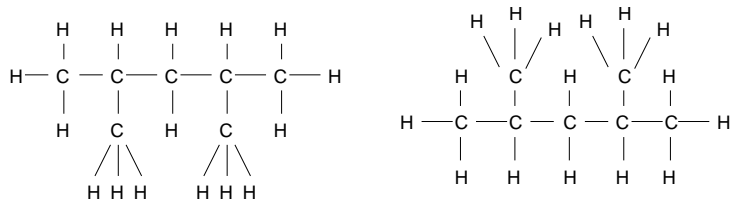


5. What is the difference between a saturated and unsaturated hydrocarbon? Give an example of each type.

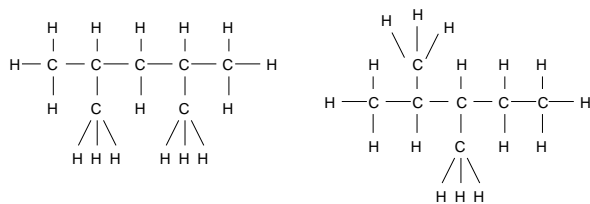
6. What is the difference between a monounsaturated and polyunsaturated oil?

7. (Waldron, 3.25) Like graphite, the buckyball is known to have lubricating properties. From an understanding of the structure of these two molecules, explain how buckyballs are able to act as lubricants.

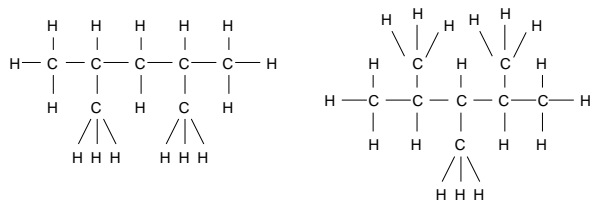
8. Are the following compounds isomers, identical, or neither?



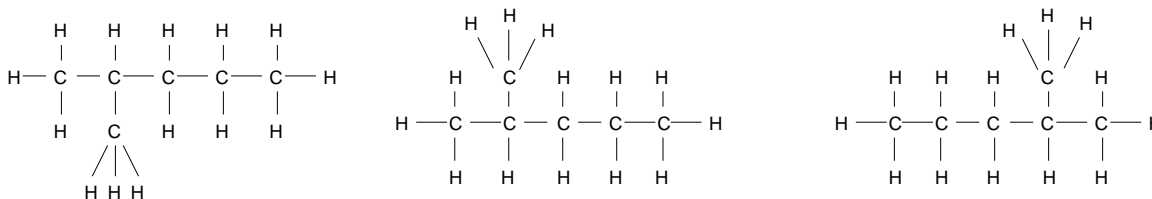
9. Are the following compounds isomers, identical, or neither?



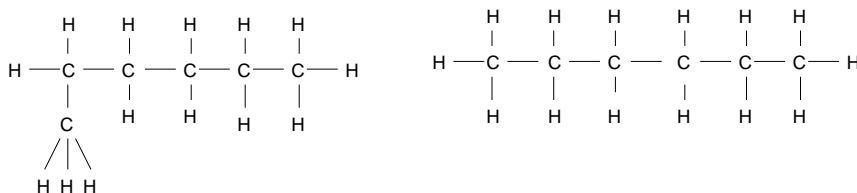
10. Are the following compounds isomers, identical, or neither?



11. There are a 12 different structural isomers of heptane, C_7H_{16} . Your task will be to draw five unique ones. Each of your structures should have a different bonding skeleton for the carbons. Avoid duplicating structures. If you can flip one structure over and get another one of your structures, these are not unique. Molecules can rotate. They are also capable of rotating around carbon-carbon bonds. This means that if you can twist part of the molecule around a C-C bond and get another structure, the two are not unique. Also, simply bending the structure will not constitute a new isomer. Here are some examples of some molecules which are identical, rather than being isomers:



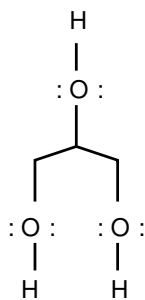
All three of these structures above are the same molecule. They each consist of a five carbon chain with a one carbon branch off the second carbon. They are merely rotated from one another. These are identical, rather than being isomers. See discussion 6 for all the unique isomers of hexane.



Similarly, both of these structures are the same molecule. They both consist of a six carbons in a row, with no branches. The bend in the first structure does not change the carbon skeleton.

Attach a sheet containing your structures.

12. (Waldron 3.38) Glycerol is sometimes used in toothpaste as a moistening agent. (a) draw the full structure (b) determine the chemical formula and molar mass.



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13. Count the number of valence electrons and draw the Lewis Electron Dot Structures for each of the molecules below. Once the Lewis Electron Dot Structure is drawn, predict the shape for each molecule.

(a) H_2S # valence e^- _____

Shape: _____

(b) CCl_4 # valence e^- _____

Shape: _____

(c) PBr_3 # valence e^- _____

Shape: _____

(d) CS_2 # valence e^- _____

Shape: _____

(e) CH_2Cl_2 # valence e^- _____

Shape: _____

(f) CSH_2 # valence e^- _____

Shape: _____