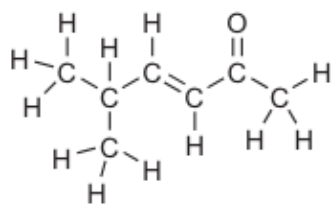
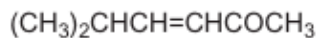


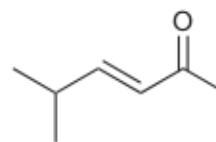
Three different ways to draw the same compound:



Kekule



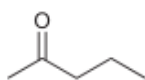
Condensed



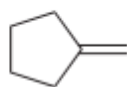
Bond Line

## Practice Problems

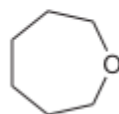
**EXERCISE 1.1** Count the number of carbon atoms in each of the following drawings:



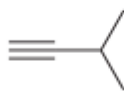
**PROBLEMS** Count the number of carbon atoms in each of the following drawings.



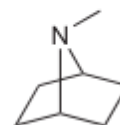
**1.2** Answer: \_\_\_\_



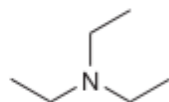
**1.3** Answer: \_\_\_\_



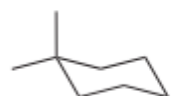
**1.4** Answer: \_\_\_\_



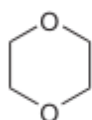
**1.5** Answer: \_\_\_\_



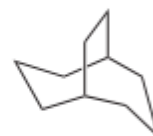
**1.6** Answer: \_\_\_\_



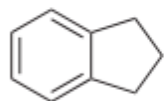
**1.7** Answer: \_\_\_\_



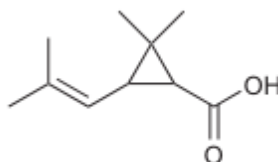
**1.8** Answer: \_\_\_\_



**1.9** Answer: \_\_\_\_

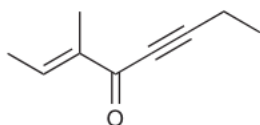


**1.10** Answer: \_\_\_\_

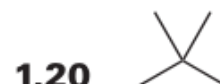
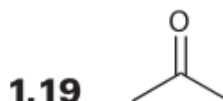
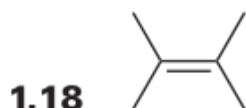
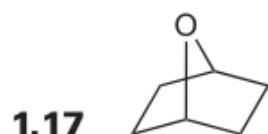
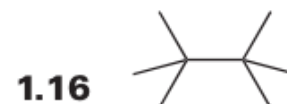
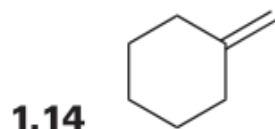
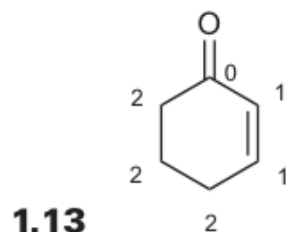


**1.11** Answer: \_\_\_\_

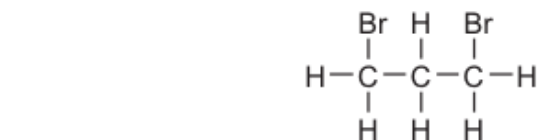
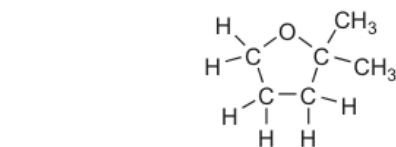
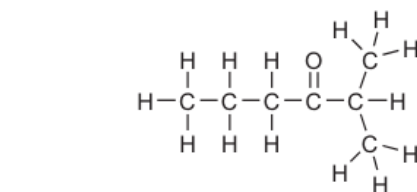
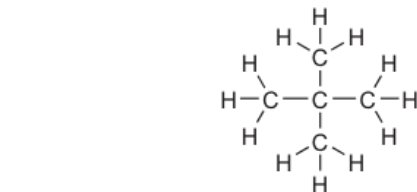
**EXERCISE 1.12** The following molecule has nine carbon atoms. Count the number of hydrogen atoms connected to each carbon atom.



**PROBLEMS** For each of the following molecules, count the number of hydrogen atoms connected to each carbon atom. The first problem has been solved for you (the numbers indicate how many hydrogen atoms are attached to each carbon).



**PROBLEMS** For each structure below, draw the bond-line drawing in the box provided.



**PROBLEMS** For each of the following reactions, clearly state what change has taken place. In each case your sentence should start with one of the following opening clauses: we have added . . . , we have eliminated . . . , or we have substituted . . . .



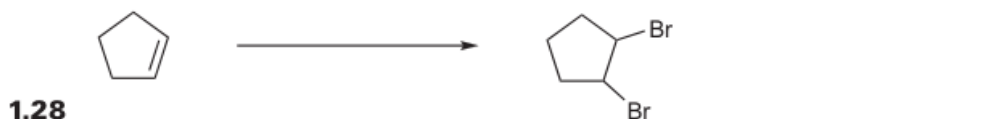
Answer: \_\_\_\_\_  
\_\_\_\_\_



Answer: \_\_\_\_\_  
\_\_\_\_\_



Answer: \_\_\_\_\_  
\_\_\_\_\_



Answer: \_\_\_\_\_  
\_\_\_\_\_



Answer: \_\_\_\_\_  
\_\_\_\_\_

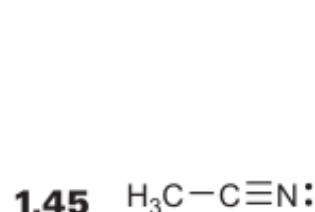
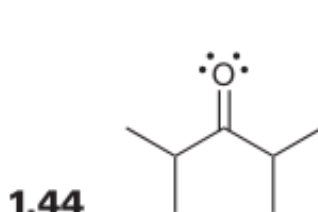
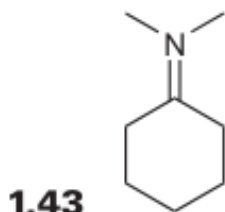
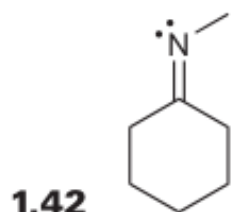
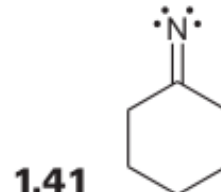
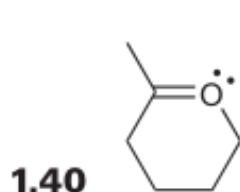
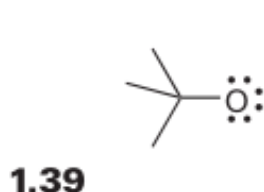
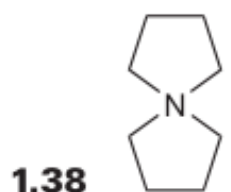
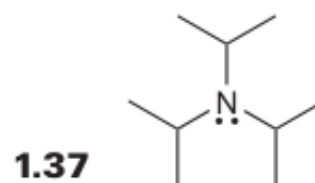
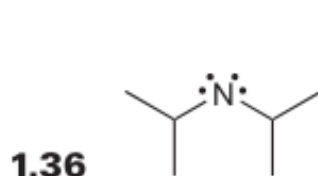
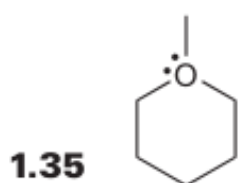
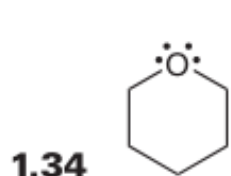


Answer: \_\_\_\_\_  
\_\_\_\_\_

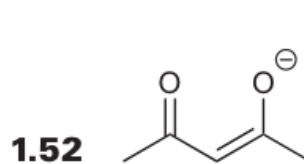
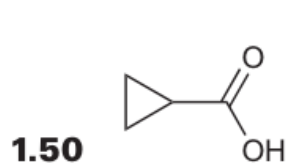


Answer: \_\_\_\_\_  
\_\_\_\_\_

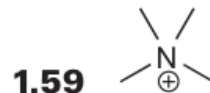
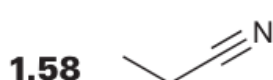
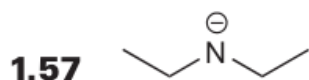
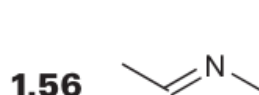
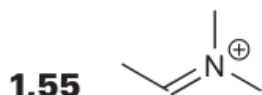
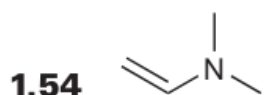
**PROBLEMS** For each of the structures below determine if the oxygen or nitrogen atom has a formal charge. If there is a charge, draw the charge.



**PROBLEMS** Review the common situations above, and then come back to these problems. For each of the following structures, draw all lone pairs. Try to recognize how many lone pairs there are *without* having to count. Then count to see if you were right.



**PROBLEMS** Review the common situations for nitrogen, and then come back to these problems. For each of the following structures, draw all lone pairs. Try to recognize how many lone pairs there are *without* having to count. Then count to see if you were right.



**MORE PROBLEMS** For each of the following structures, draw all lone pairs.

