1. Identify the longest contiguous carbon chain and assign the root name for the following:
   a. 
   b. 
   c. 
   d. 
   e. 
   f. 
   g. 
   h. 

2. For each of the following molecules identify and name all substituents:
   (a) 
   (b) 
   (c) 
   (d) 
   (e) 
   (f) 
   (g) 

3. For each of the following molecules name the complex substituents:
   (a) 
   (b) 
   (c) 
   (d) 
   (e)
4. Put it together! Give systematic names for each of the following compounds:

(a)  
(b)  
(c)  
(d)  
(e)  
(f)  
(g)  
(h)  
(i)  
(j)  
(k)  
(l)  
(m)  
(n)  
(o)  
(p)  
(q)  

5. Now go the other way! Provide skeletal structures for the following molecules:

(a) 3-Isopropyl-2,4-dimethylpentane  
(b) 4-Ethyl-2-methylhexane  
(c) 1,1,2,2-Tetramethylocyclopropane
6. For each pair of compounds indicate whether they are identical or constitutional isomers:

(a)

(b)

(c)

(d)
1. 
   a) parent = hexane       b) parent = heptane
   c) parent = heptanes    c) parent = nonane
   e) parent = octane     d) parent = heptane
   g) parent = cyclopentane h) parent = cycloheptane
   i) parent = cyclopropane

2. 
   a) All groups are methyl groups
   b) methyl
   c) methyl
   d) ethyl
   e) methyl
   f) cyclobutyl

3. 
   a) tert-butyl
   b) isopropyl
   c) isobutyl
   d) isobutyl
   e) sec-butyl
   f) tert-butyl

4. 
   a) 3,4,6-trimethylheptane 
   b) sec-butylcyclohexane 
   c) 3-ethyl-2-methylheptane 
   d) 3-isopropyl-2,4-dimethylpentane 
   e) 3-ethyl-2,2-dimethyloxane 
   f) 2-cyclohexyl-4-ethyl-5,6-dimethylcyclohexane 
   g) 3-ethyl-2,5-dimethyl-4-propylpentane 
   h) 5-sec-butyl-4-ethyl-2-methyldecane 
   i) 2,2,6,6,7,7-hexamethylnonane 
   k) 2,4,4,6-tetramethylheptane 
   l) 2,2,4-trimethylpentane 
   m) 4-tert-butylheptane 
   n) 3-ethyl-6-isopropyl-2,4-dimethyldecane 
   o) 3,5-diethyl-2-methylcyclohexane 
   p) 1,3-diisopropylcyclopentane 
   q) 3-ethyl-2,5-dimethylheptane
5. a) 

b) 

c) 

6. 

a) same compound
b) same compound
c) same compound
d) constitutional isomers