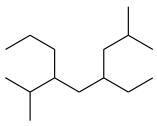
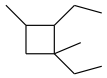
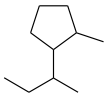
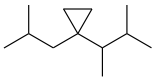
(10) 1. Give valid names for the following compounds:

a) 

b) 

c) 

d) 

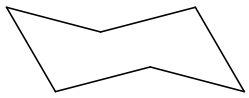
(10) 2. Draw structures of the following compounds:

a) 5-isobutyl-4-propylnonane
b) *trans*-1,3-diethylcyclopentane
c) 1-methyl-3-(1,2,2-trimethylbutyl)cycloheptane
d) 4-*sec*-butyl-1-*tert*-butyl-2-cyclopropylcyclooctane

(6) 3. Draw:

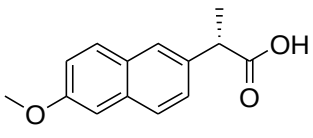
a) A gauche interaction
b) A Newman projection showing the *lower energy* eclipsed conformation about the indicated bond of $BrCH(CH_3)—CH(CH_3)_2$

(6) 4. Using the template shown, draw the lowest energy conformation of *trans*-1-*tert*-butyl-3-methylcyclohexane.

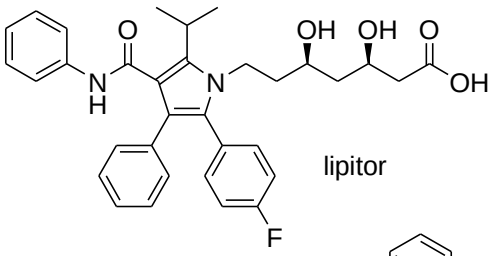


(8) 5. Briefly explain the terms *angle strain* and *torsional strain*, and provide an example in each case that exhibits this sort of strain.

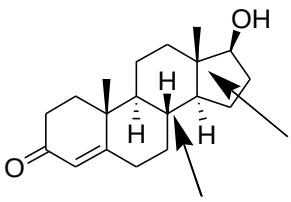
(20) 6. In each case below, identify all stereogenic centers and label them *R* or *S*.



naproxen

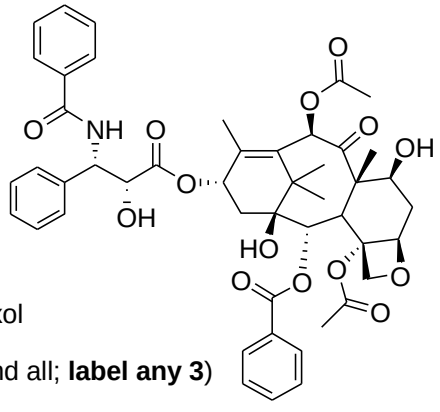


lipitor



testosterone

(find all; **label just the indicated 2**)

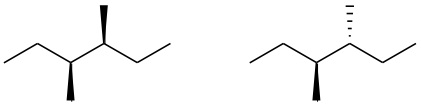


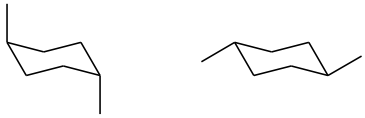
taxol

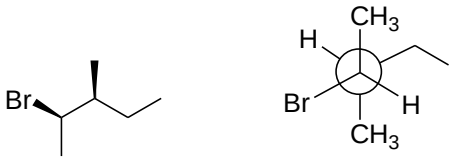
(find all; **label any 3**)

(12) 7. In each case below, identify the relationship between the given compounds as *diastereomers, enantiomers, constitutional isomers,* or *identical.*

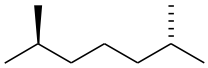
a) 

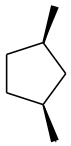
b) 

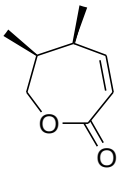
c) 

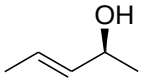
d) 

(8) 8. For each compound below, indicate if the compound is chiral or achiral. If chiral, draw its enantiomer. If a meso compound, indicate that as well.

a) 

b) 

c) 

d) 

(8) 9. Explain…

a) …the difference between *measured optical rotation* and *specific rotation.*
b) … why *enantiomeric excess* and *optical purity* are the same.

(12) 10. The reported $[\alpha]_D$ for enantiomerically pure compound X is -120^o. Calculate…

a) …the EE for a sample for which the specific rotation was found to be -36^o.
b) … the ratio of (+)X to (–)X in this sample.
c) … the rotation you would expect to observe if 0.10 grams of pure compound X is dissolved in enough ethanol to make 20 mL of solution, and the optical rotation is determined using a 2.0-dm cell.