1. (self-explanatory)

2. a. Starting materials: 1-bromopropane, PPh3, then nBuLi/THF (or NaHMDS/ether or toluene which actually gives higher cis selectivity (fyi)) then pentanal. OR: 1-bromopentane and propanal, etc.

b. trans-3-octene

c. ^{1}H NMR coupling constants (Jcis=6-12 and Jtrans=12-18)

d. Lindlar reduction of 3-octyne and Li/NH3 reduction of 3-octyne. Compare NMR spectra to that/those obtained for Wittig product(s).

3. 4-(para-nitrophenyl)-1-butanol.

4. 2-cyclohexenone (conjugated). The M-28 in the MS is loss of C=O.

5. C4 H8 O in both cases.

a. 3-buten-1-ol (CH2=CH-CH2-CH2-OH, the 5.0 - 6.0 ppm pattern is typical for a terminal alkene attached to a CH2.)

b. 1-buten-3-ol (CH2=CH-CH(OH)-CH3, the 5.0 - 6.0 ppm pattern is typical for a terminal alkene attached to a CH. Hard to see, but 5.9 ppm peak is a ddd, and the other 2 alkenes are geminal, exhibiting only cis and trans and trans coupling to the alkenyl CH.)