

First Letter of Last Name

Key

Write your name above this line

2283g Midterm  
 Dr. Brian Pagenkopf  
 Friday, March 4, 2011  
 6:30 pm – 9:30 pm

Please do not leave the exam room within the first 30 minutes or the last 30 minutes. During the last 30 minutes when you finish do not bring your exam up to the front of the room until the exam time is over. No notes, books, calculators, cell phones, iPods, computers or electronics of any sort allowed. Please turn off the ringer on your phone now.

Be sure you have all of the exam pages.

**PERIODIC TABLE OF THE ELEMENTS**

Atomic masses are based on <sup>12</sup>C. Atomic masses in parentheses are for the most stable isotope.

6 <b>C</b> 12.011																		2 <b>He</b> 4.00260						
Groups																								
Periods																								
1A																	VIIIA							
1 <b>H</b> 1.0079																	2 <b>He</b> 4.00260							
3 <b>Li</b> 6.941		4 <b>Be</b> 9.01218																	5 <b>B</b> 10.81	6 <b>C</b> 12.011	7 <b>N</b> 14.0067	8 <b>O</b> 15.9994	9 <b>F</b> 18.998403	10 <b>Ne</b> 20.179
11 <b>Na</b> 22.98977		12 <b>Mg</b> 24.305																	13 <b>Al</b> 26.98154	14 <b>Si</b> 28.0855	15 <b>P</b> 30.97376	16 <b>S</b> 32.06	17 <b>Cl</b> 35.453	18 <b>Ar</b> 39.948
19 <b>K</b> 39.0983	20 <b>Ca</b> 40.08	21 <b>Sc</b> 44.9559	22 <b>Ti</b> 47.90	23 <b>V</b> 50.9415	24 <b>Cr</b> 51.996	25 <b>Mn</b> 54.9380	26 <b>Fe</b> 55.847	27 <b>Co</b> 58.9332	28 <b>Ni</b> 58.70	29 <b>Cu</b> 63.546	30 <b>Zn</b> 65.38	31 <b>Ga</b> 69.72	32 <b>Ge</b> 72.59	33 <b>As</b> 74.9216	34 <b>Se</b> 78.96	35 <b>Br</b> 79.904	36 <b>Kr</b> 83.80							
37 <b>Rb</b> 85.4678	38 <b>Sr</b> 87.62	39 <b>Y</b> 88.9059	40 <b>Zr</b> 91.22	41 <b>Nb</b> 92.9064	42 <b>Mo</b> 95.94	43 <b>Tc</b> (98)	44 <b>Ru</b> 101.07	45 <b>Rh</b> 102.9055	46 <b>Pd</b> 106.4	47 <b>Ag</b> 107.868	48 <b>Cd</b> 112.41	49 <b>In</b> 114.82	50 <b>Sn</b> 118.69	51 <b>Sb</b> 121.75	52 <b>Te</b> 127.60	53 <b>I</b> 126.9045	54 <b>Xe</b> 131.30							
55 <b>Cs</b> 132.9054	56 <b>Ba</b> 137.33	57 <b>La</b> 138.9055	72 <b>Hf</b> 178.49	73 <b>Ta</b> 180.9479	74 <b>W</b> 183.85	75 <b>Re</b> 186.207	76 <b>Os</b> 190.2	77 <b>Ir</b> 192.22	78 <b>Pt</b> 195.09	79 <b>Au</b> 196.9665	80 <b>Hg</b> 200.59	81 <b>Tl</b> 204.37	82 <b>Pb</b> 207.2	83 <b>Bi</b> 208.9804	84 <b>Po</b> (209)	85 <b>At</b> (210)	86 <b>Rn</b> (222)							
87 <b>Fr</b> (223)	88 <b>Ra</b> (226.0254)	89 <b>Ac</b> (227.0278)	104 <b>Unq</b> (261)	105 <b>Unp</b> (262)	106 <b>Unh</b> (263)																			

\*Lanthanide series

58 <b>Ce</b> 140.12	59 <b>Pr</b> 140.9077	60 <b>Nd</b> 144.24	61 <b>Pm</b> (145)	62 <b>Sm</b> 150.4	63 <b>Eu</b> 151.96	64 <b>Gd</b> 157.25	65 <b>Tb</b> 158.9254	66 <b>Dy</b> 162.50	67 <b>Ho</b> 164.9304	68 <b>Er</b> 167.26	69 <b>Tm</b> 168.9342	70 <b>Yb</b> 173.04	71 <b>Lu</b> 174.967
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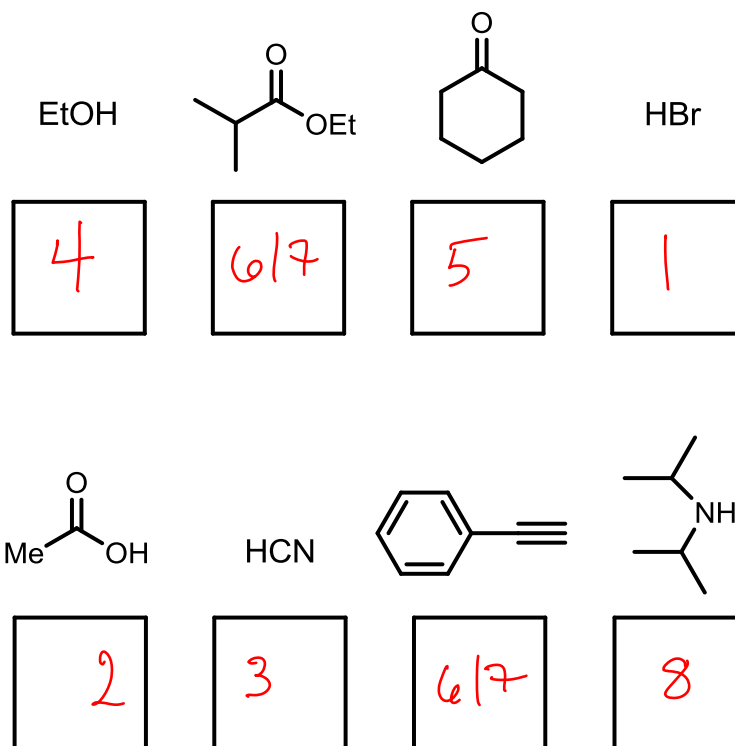
† Actinide series

90 <b>Th</b> 232.0381	91 <b>Pa</b> 231.0359	92 <b>U</b> 238.029	93 <b>Np</b> 237.0482	94 <b>Pu</b> (244)	95 <b>Am</b> (243)	96 <b>Cm</b> (247)	97 <b>Bk</b> (247)	98 <b>Cf</b> (251)	99 <b>Es</b> (252)	100 <b>Fm</b> (257)	101 <b>Md</b> (258)	102 <b>No</b> (259)	103 <b>Lr</b> (260)
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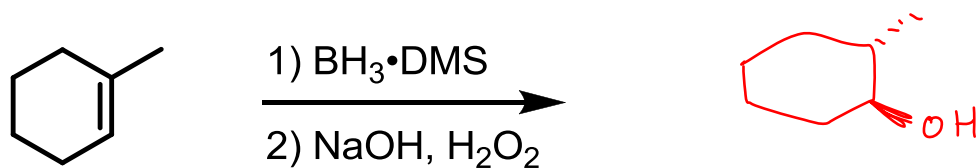
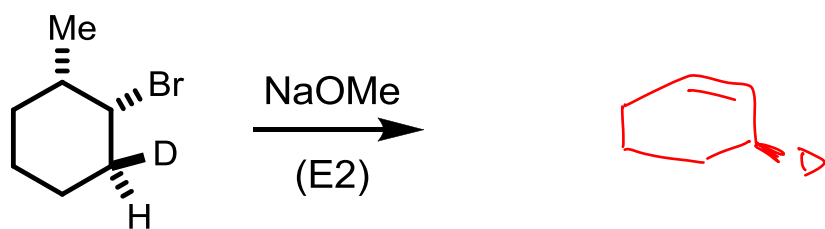
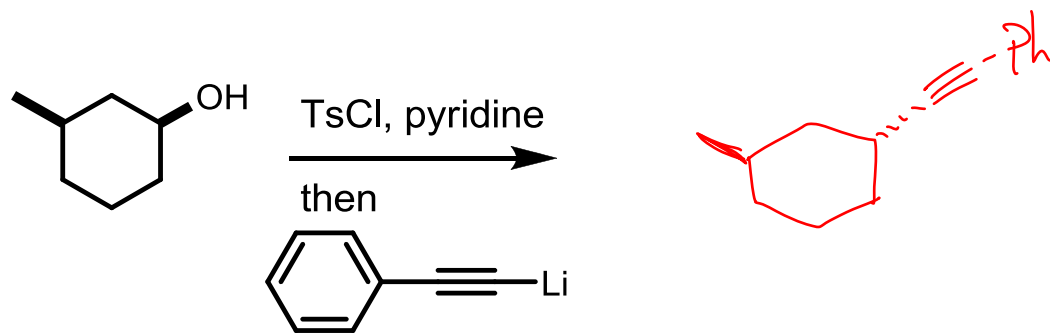
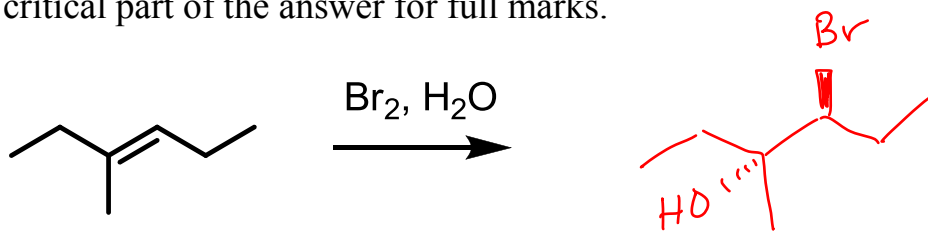
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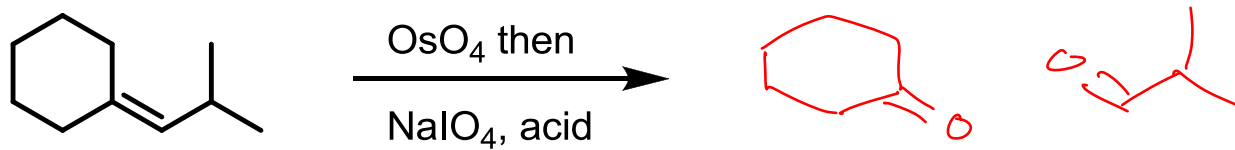
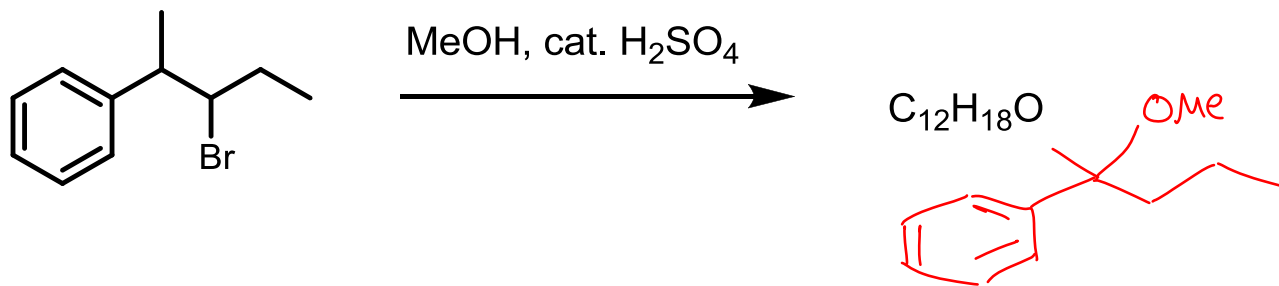
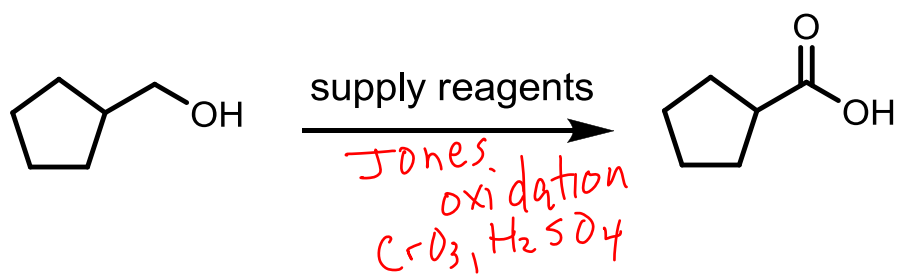
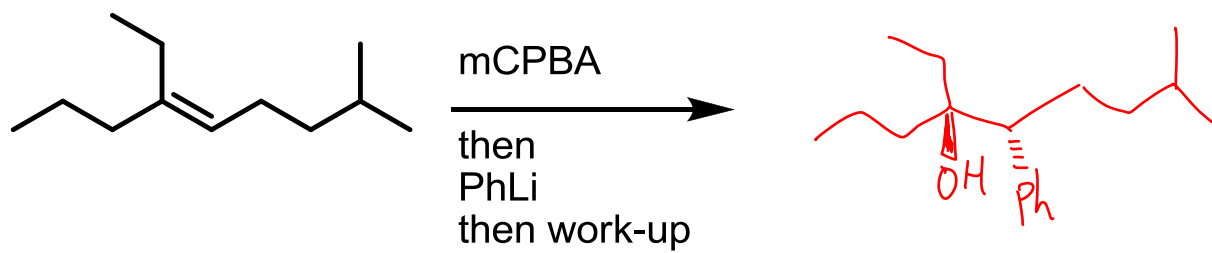
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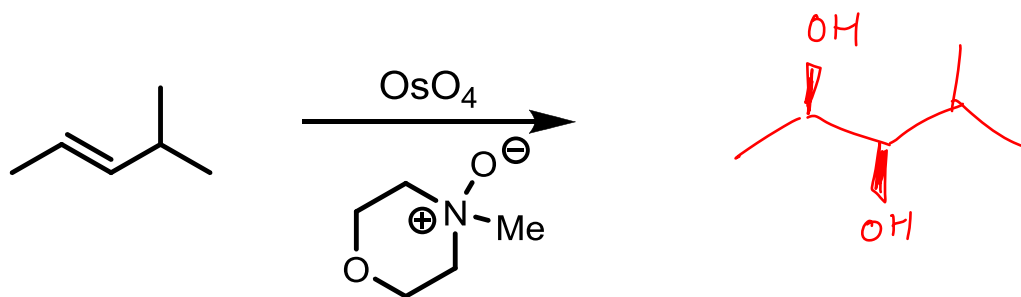
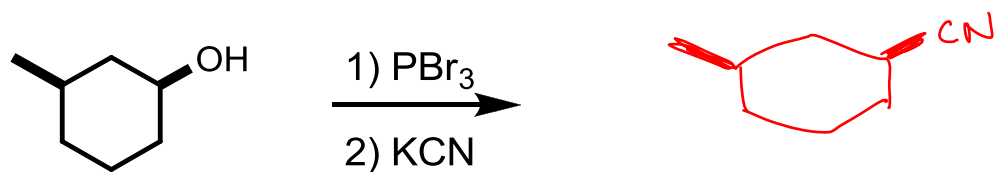
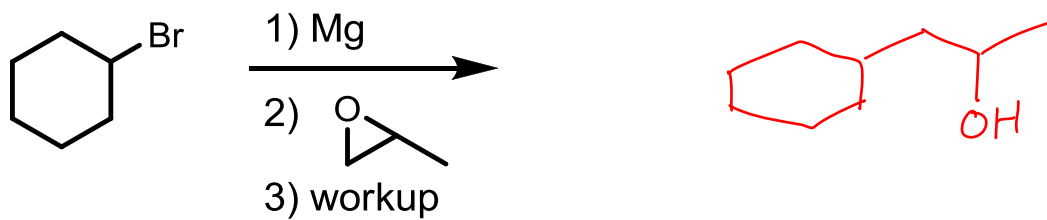
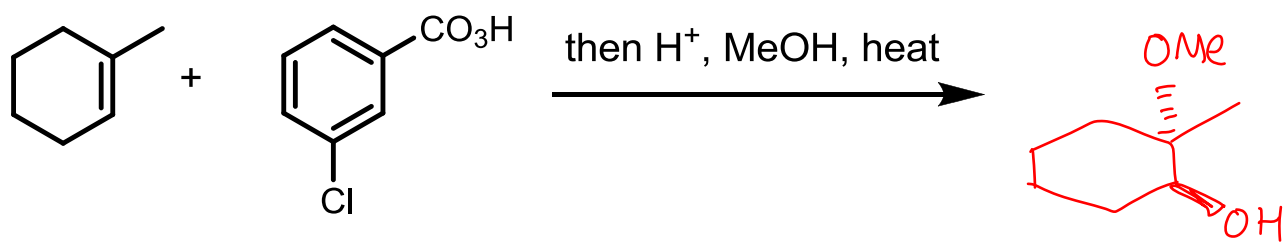
Rank the following molecules in order of increasing acidity (which is the same as decreasing pKa). Write an 8 in the box for the least acidic, a 1 in the box under the most acidic, and so on.



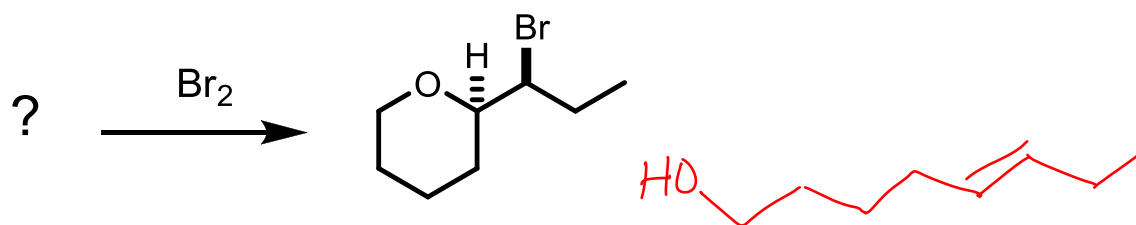
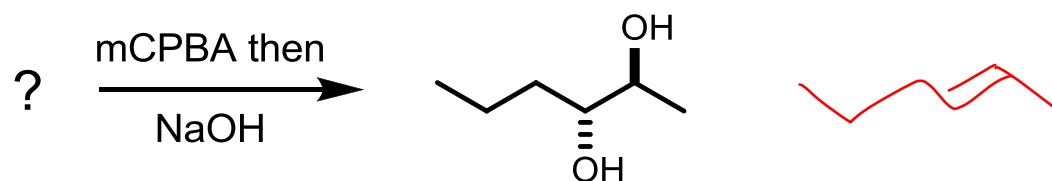
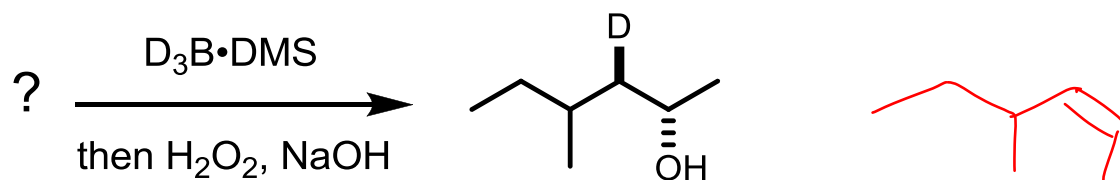
Show products for the following reactions. For some questions stereochemistry is a critical part of the answer for full marks.



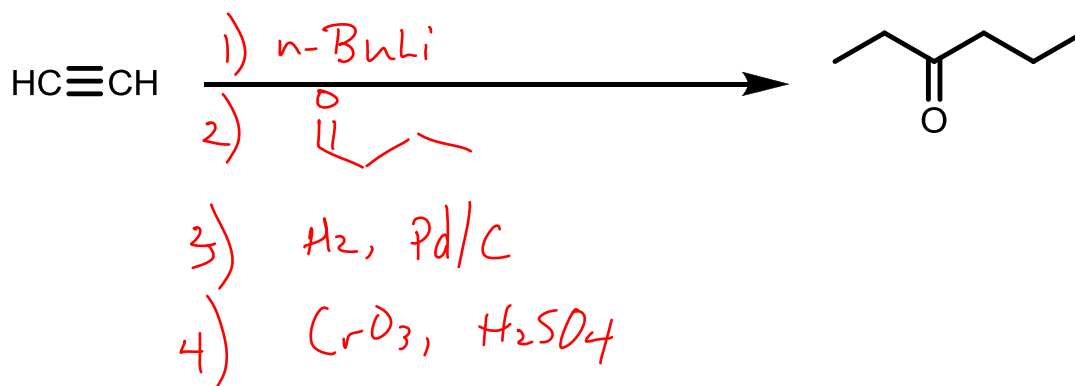
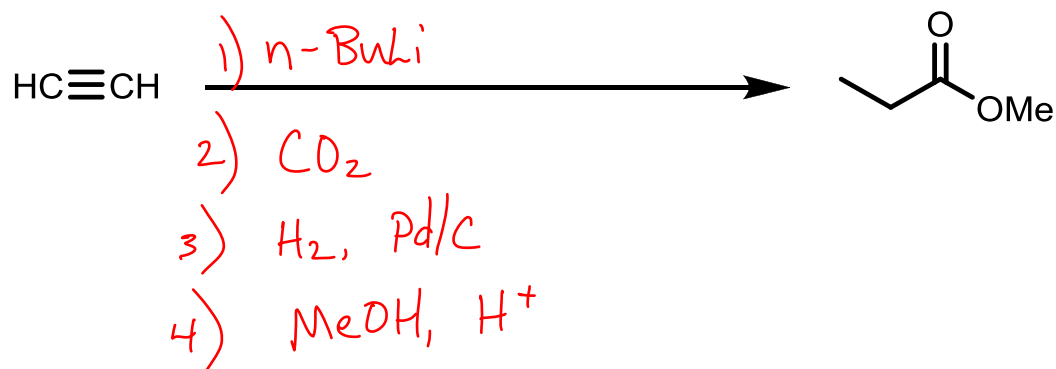




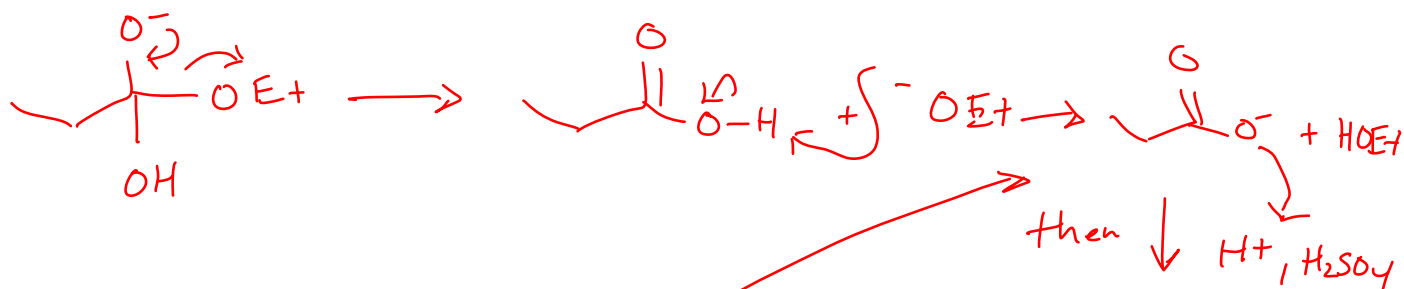
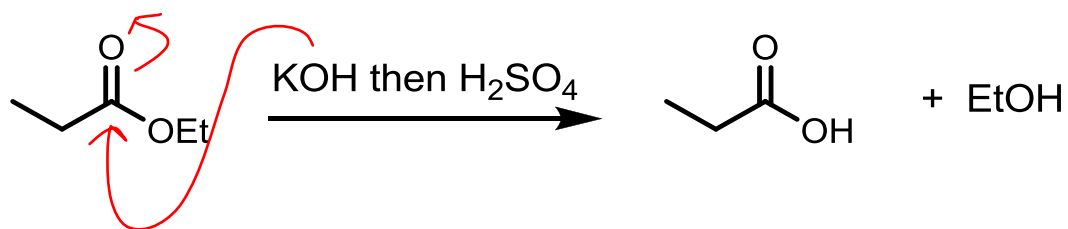
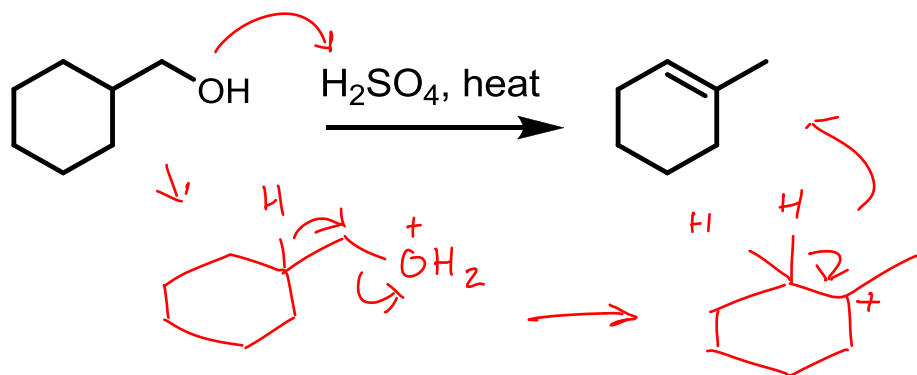
Identify an appropriate alkene starting material, being careful in regard to cis//trans geometry of the alkene. You may need to do some bond rotations.



Provide reagents to effect the following transformations. More than one step may be required.



Provide a plausible mechanism for the following transformation.



Better:

