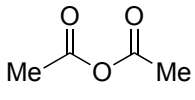
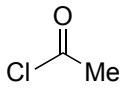
Worksheet 4, Chem 51C, Jarvo

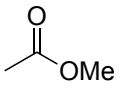
1. a. Rank the electrophilicity of the following compounds from most to least:



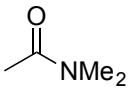
A



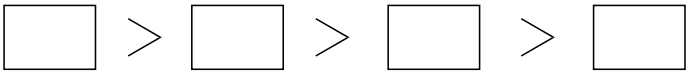
B



C

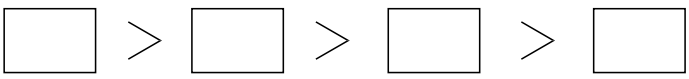


D

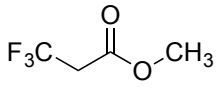


b. For each compound above, draw the leaving group when reacting with Nuc: and rank the conjugate acid in order of their pKa:

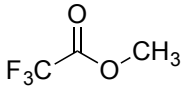
A B C D



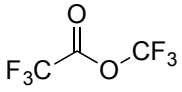
c. Rank the following from most to least electrophilic:



A

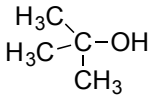
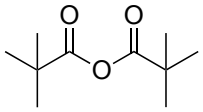
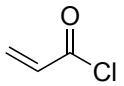
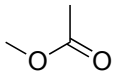
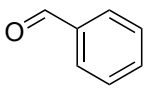


B

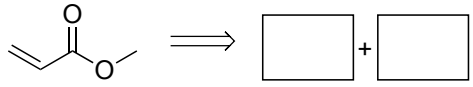


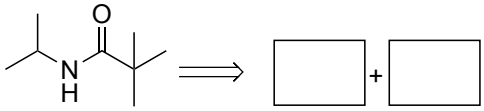
C

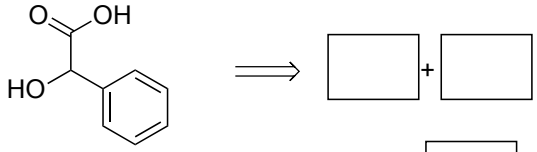
d. Fill in the correct nucleophile and electrophile from the table to complete the retrosyntheses.

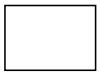
Nucleophiles	Electrophiles
A 	E 
B H_3C-OH	F 
C NaCN	G 
D 	H 
	I 

Products

i. 

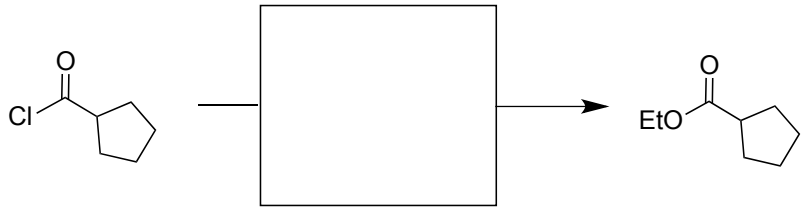
ii. 

iii. 

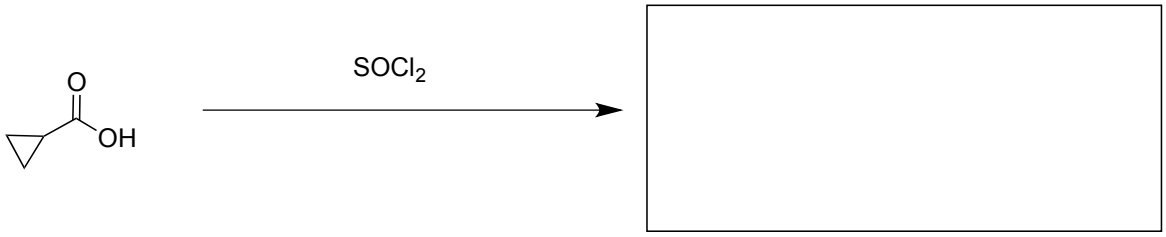
then 

2. Fill in the boxes with the appropriate starting material, reagent or major product.
Show stereochemistry where appropriate

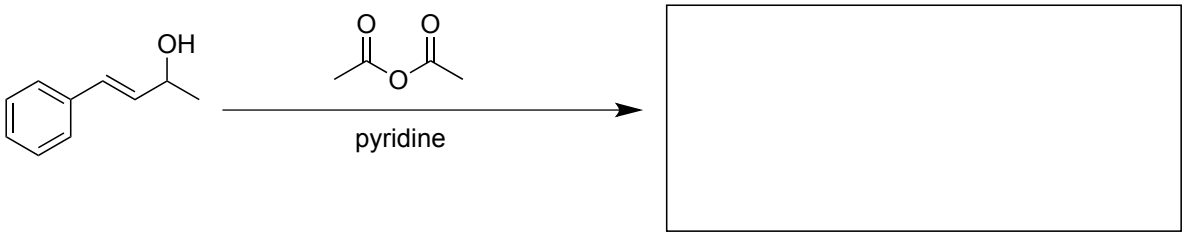
a.



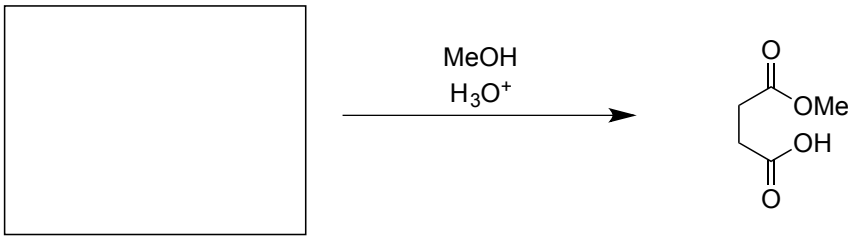
b.



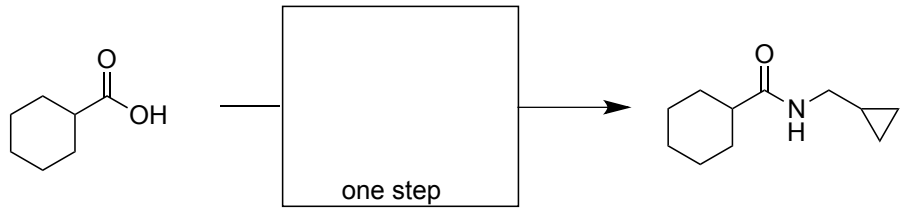
c.



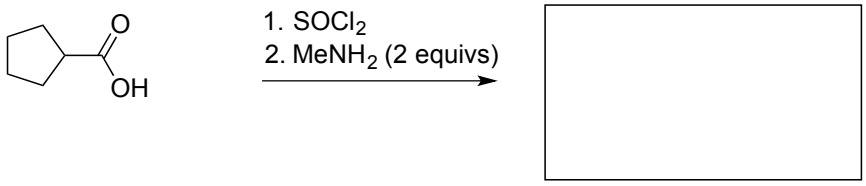
d.



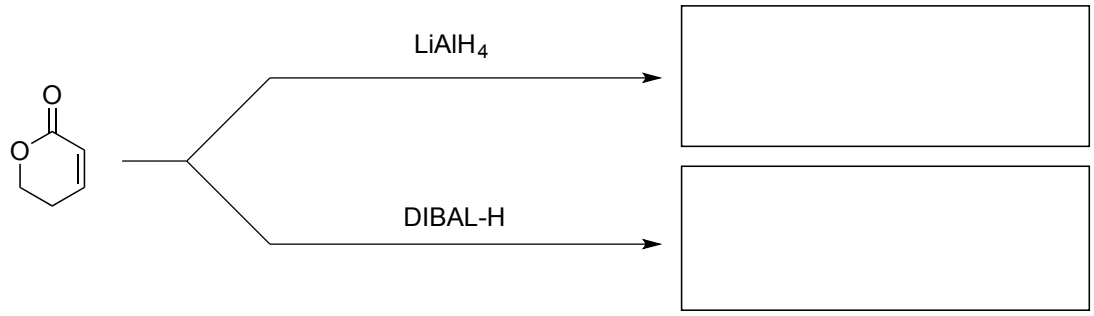
e.



f.

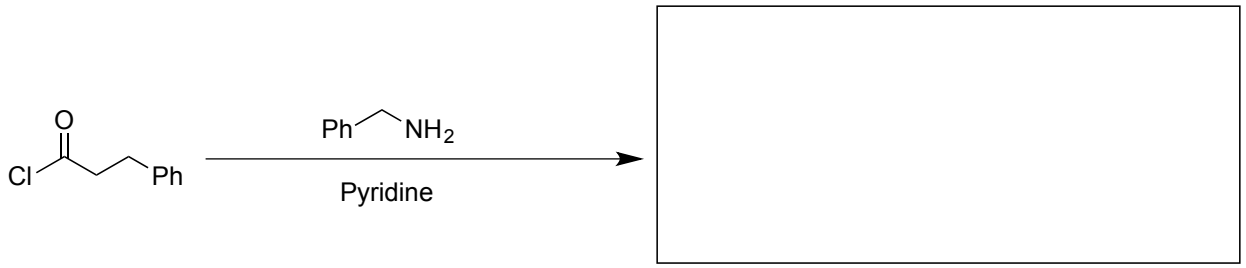


g.

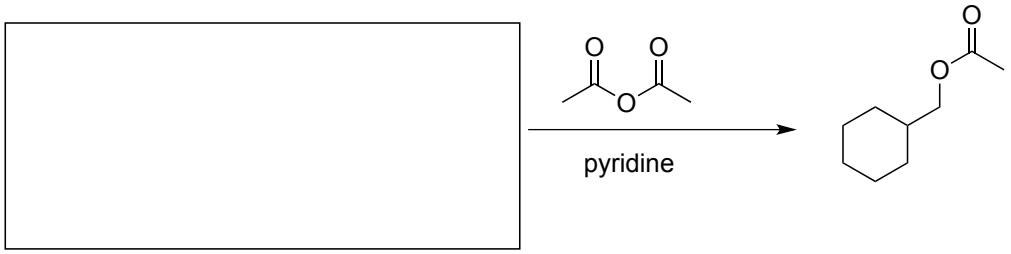


3. Fill in the blank and provide an arrow-pushing mechanism.

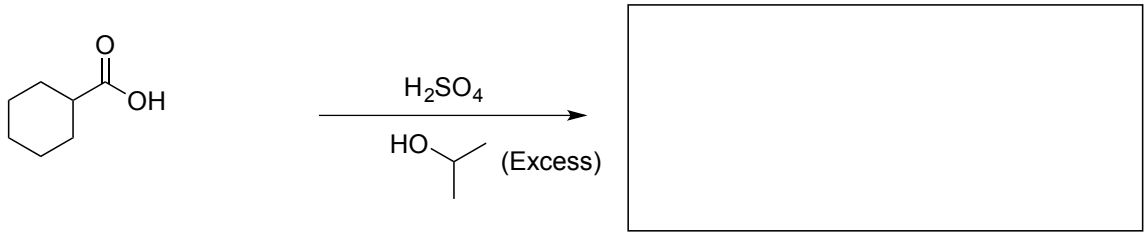
a.



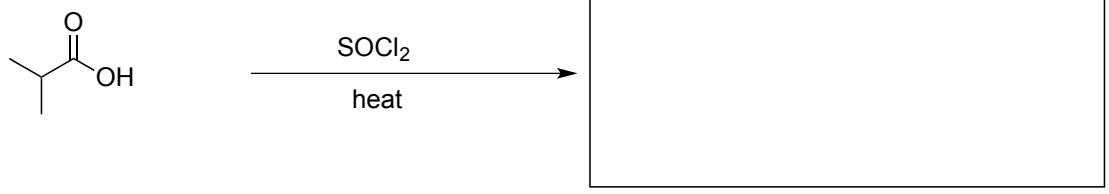
b.



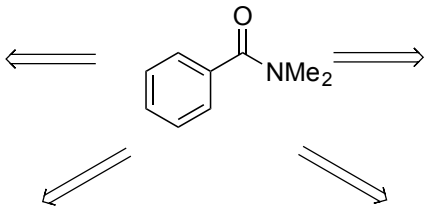
c.



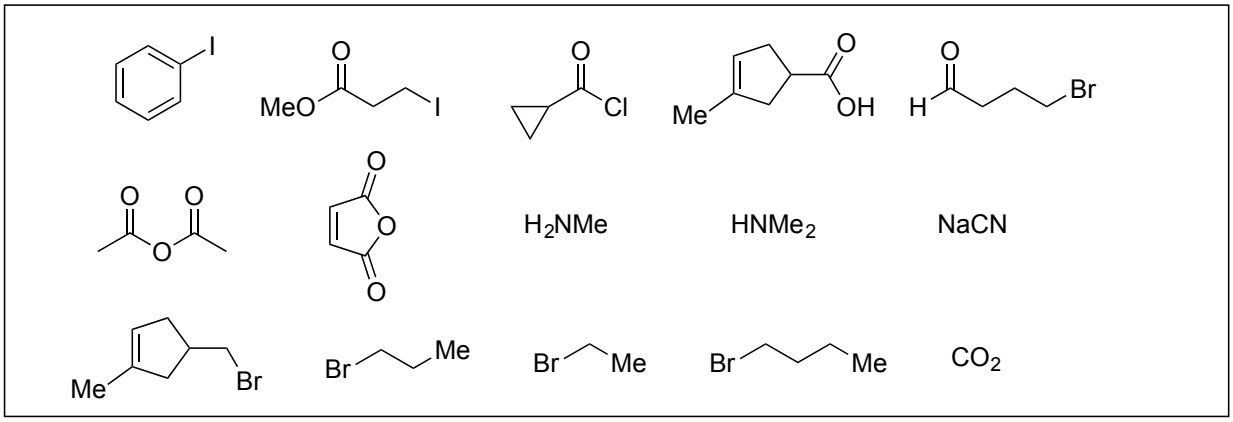
d.



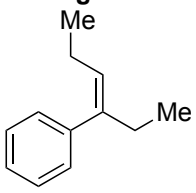
4. Show at least four different methods for synthesis of the amide below, each one from a different starting material and using different reagents.



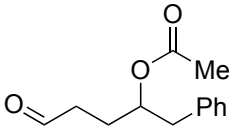
5. Propose syntheses of the targets shown below. You can use any of the possible starting materials and any reagent you wish. All the carbon must come from the starting materials provided.



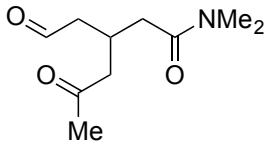
Target A.



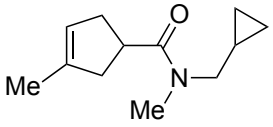
Target B.



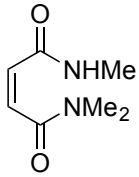
Target C.



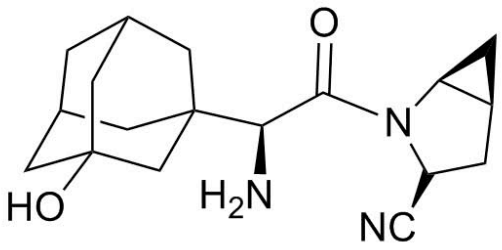
Target D.



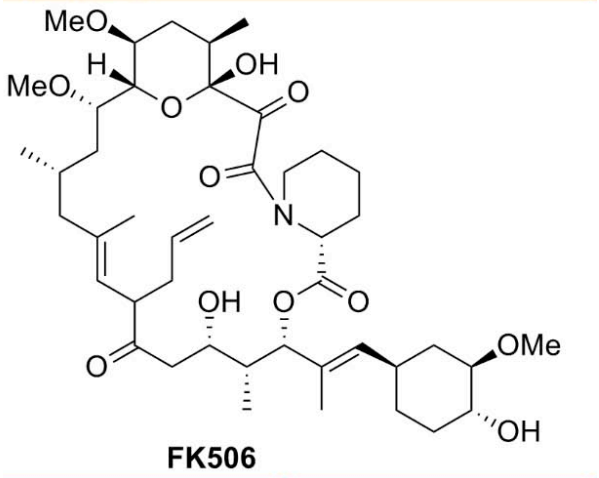
Target E.



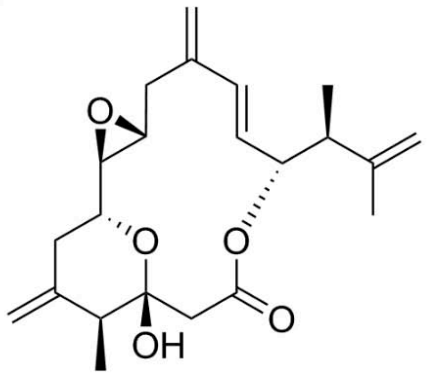
6. In each of the following natural products or medicines, circle and label the functional groups: acetal, alcohol, amide, amine, epoxide, ester, ether, hemiacetal, ketone, nitrile



Saxagliptin
(Onglyza®)



FK506



(–)-Amphidinolide P