   a. Predict the cyclic intermediate and the major product for the following reactions.

![Diagram of reactions with intermediates and products](image)

b. Draw the structure of IMes ligand.

![Structure of IMes ligand](image)

c. Propose a synthesis pathway for ($\pm$) DP-IPr ligand.

![Diagram of synthesis pathway](image)
d. Based on your answer to part a, predict the major products under the following conditions.


a. Predict the major product.

b. (Bonus: For each reaction in 2a, draw the intermediate that undergoes reductive elimination during the catalytic cycle)