1. What type of substituent (a or b) will enhance electrophilic aromatic substitution? Briefly explain your answer.

Electron donating groups increase reaction rate for electrophilic aromatic substitution since donating groups increase \( \pi \) density in the ring which lowers activation energy of intermediate cation.

2. Consider the directing influence of the substituents on the aromatic ring below and draw the most likely product for each. No need to draw minor isomers.

3. Benzyne can be generated by formation of a Grignard type intermediate from \( \alpha \)-bromofluorobenzene:

Draw the Diels-Alder cycloadduct formed when benzyne is made in situ in the presence of cyclopentadiene: