BC367, Fall 2019 Problem set #1 Due: Friday, September 6

(Please answer each question on a separate sheet of paper.)

1. To a 75.3 mL solution of 0.265 M chlorous acid (pK_a = 1.94) is added 9.50 mL of 1.00 M sodium hydroxide. What is the final pH of the solution?

2. Sketch titration curves for 0.10 M solutions of each of the following diprotic acids with 1.0 M sodium hydroxide:

    a. "Kevinic acid" ($pK_{a,1}$ = 2.5, $pK_{a,2}$ = 7.3)

    b. "Riceous acid" ($pK_{a,1}$ = 7.3, $pK_{a,2}$ = 8.1)

3. If you wanted to make a buffer solution at pH 7.4 using "Riceous acid", what volume of 1.0 M HCl would you need to add to a solution containing 0.750 mole of the fully deprotonated molecule (*e.g.* its sodium salt)? Include all calculations – show your work!