1. Find the pH of a solution that is 0.195 M $HC_2H_3O_2$ and 0.125 M $NaC_2H_3O_2$, using both an ICE chart and the Henderson-Hasselbalch equation. (For $HC_2H_3O_2$, $K_a = 1.8 \times 10^{-5}$).

2. Find the pH of a solution that is 0.255 M CH_3NH_2 and 0.135 M CH_3NH_3Br, using both an ICE chart and the Henderson-Hasselbalch equation. (For CH_3NH_2, $K_b = 4.4 \times 10^{-4}$).

3. For the acetic acid / acetate buffer in Problem 1, write the pertinent chemical reactions that would occur if a strong acid were added and if a strong base were added.

4. Calculate the molar ratio and the mass ratio of NaF to HF required to create a buffer with pH = 4.00. (For HF, $K_a = 3.4 \times 10^{-4}$)

5. Determine whether or not the mixing of each pair of solutions results in a buffer.

   (a) 75.0 mL of 0.10 M HF; 55.0 mL of 0.15 M NaF

   (b) 150.0 mL of 0.10 M HF; 135.0 mL of 0.175 M HCl

   (c) 125.0 mL of 0.15 M CH_3NH_2; 120.0 mL of 0.25 M CH_3NH_3Cl

6. A 100.0 mL buffer solution is 0.175 M HClO ($K_a = 2.9 \times 10^{-8}$) and 0.150 M in NaClO.

   (a) What is the initial pH of this solution?
   (b) What is the pH after addition of 0.00185 moles of HBr?
   (c) What is the pH after addition of 0.00213 moles of NaOH?