WEAK ACIDS AND THE EQUILIBRIUM CONSTANT

NAME _____ SECTION _____

1. The chemical equation which describes how the weak acid $HC_2H_3O_2$ dissociates in aqueous solution is,

$$HC_2H_3O_2(aq) \rightleftharpoons H^+(aq) + C_2H_3O_2^-(aq)$$

   a. In the data you obtained earlier (Acids, Bases and pH, pg. 55), the initial concentration of $HC_2H_3O_2$ is 0.100 M. In the space provided below (**ICE** Table), enter the initial concentration of $HC_2H_3O_2$, H^+, and $C_2H_3O_2^-$. Based on the measured pH of this solution, calculate and enter the equilibrium concentration of H^+.

$$HC_2H_3O_2(aq) \rightleftharpoons H^+(aq) + C_2H_3O_2^-(aq)$$

Initial Concentrations	_____	_____	_____
Change	_____	_____	_____
Equilibrium Concentrations	_____	_____	_____

   b. Calculate the change in $[H^+]$.

   c. Using the balanced chemical equation and the calculated change in $[H^+]$, calculate the change in $[HC_2H_3O_2]$ and $[C_2H_3O_2^-]$.

   d. Calculate the equilibrium concentration of $HC_2H_3O_2(aq)$ and $C_2H_3O_2^-(aq)$.

e. Estimate the equilibrium constant for the dissociation of $HC_2H_3O_2(aq)$.

f. Calculate the magnitude of the equilibrium constant for benzoic acid, $HC_7H_5O_2$, if a 0.100 M solution has a pH = 2.59.

g. Calculate the magnitude of the equilibrium constant for an aqueous solution of ammonia, if a 0.100 M solution has a pH = 11.13.

h. Calculate the pH of a solution which is 0.53 M $HC_6H_4NO_2$ (nicotinic acid). ($K_a = 1.4 \times 10^{-5}$)

i. Calculate the pH of a solution which is 0.712 M CH_3NH_2 (methylamine). ($K_b = 4.4 \times 10^{-4}$)