Quiz 2
Chem 311
Fall 2002

Calculate the pH of a 0.050 M solution of sodium 3-chloropropanoate ($ClCH_2CH_2COONa$).
Ka(3-Chloropropanoic Acid) = $7.8*10^{-5}$
Kw = $1.01*10^{-14}$

Sodium 3-chloropropanoate is a soluble salt that completely dissociates (just like sodium acetate). So, I have a weak base, $ClCH_2CH_2COO^-$, at a $F_B = 0.050$ M. (2)

$$ClCH_2CH_2COO^- + H_2O \overset{Kb}{\leftrightarrow} ClCH_2CH_2COOH + OH^- \qquad (1)$$

$$Kb = ([ClCH_2CH_2COOH][OH^-])/[ClCH_2CH_2COO^-] = Kw/Ka \qquad (2)$$

$$(1.01*10^{-14})/(7.8*10^{-5}) = x^2/F_B = x^2/(0.050) \qquad (1)$$

$$x = [OH^-] = 2.544*10^{-6}\ M \qquad (1)$$

$$[H_3O^+] = Kw/[OH^-] = 3.969*10^{-9}\ M \qquad (1)$$

$$pH = 8.40 \qquad (2)$$