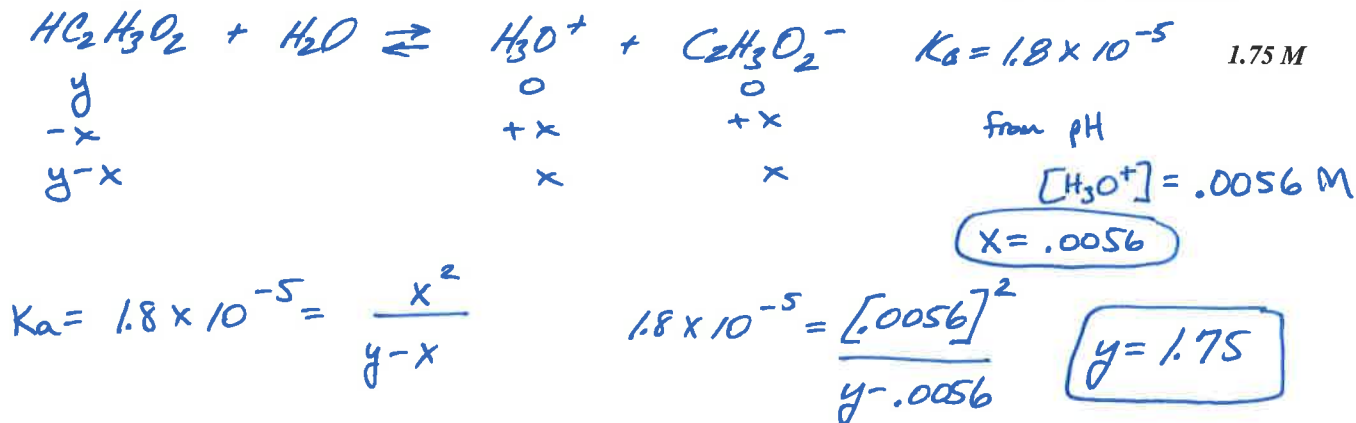


Acids & Bases Worksheet #3.5

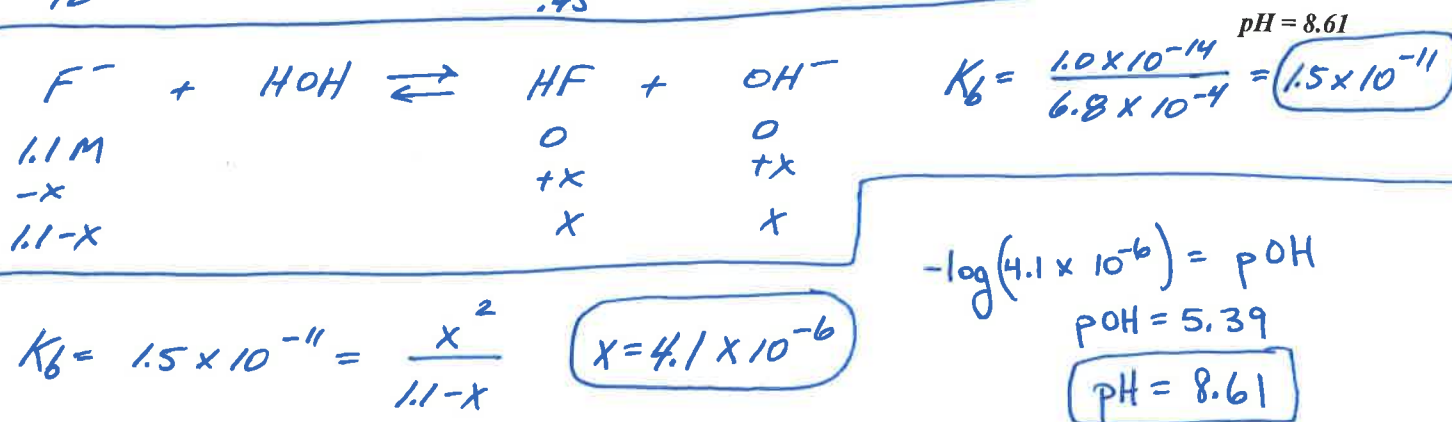
1. The pH of an acetic acid solution is measured to be 2.25. What is the molarity of this solution?



Bracken Guess .1

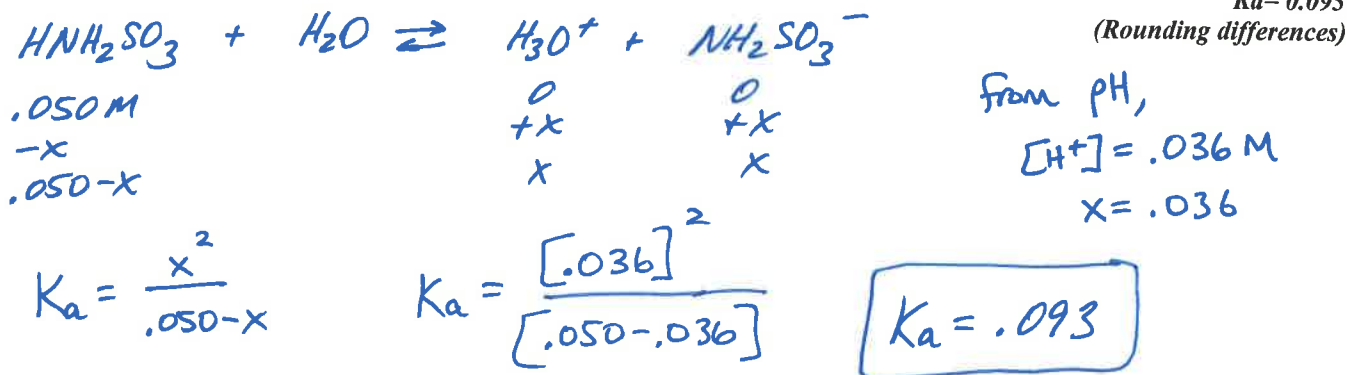
2. A student adds 21 grams of solid NaF to 450 mL of distilled water. Assuming the volume of the water does not change, what is the expected pH of the resulting solution?

$$\frac{21}{42} = .50 \text{ moles NaF} \quad \frac{.50}{.45} = 1.1 \text{ M NaF}$$



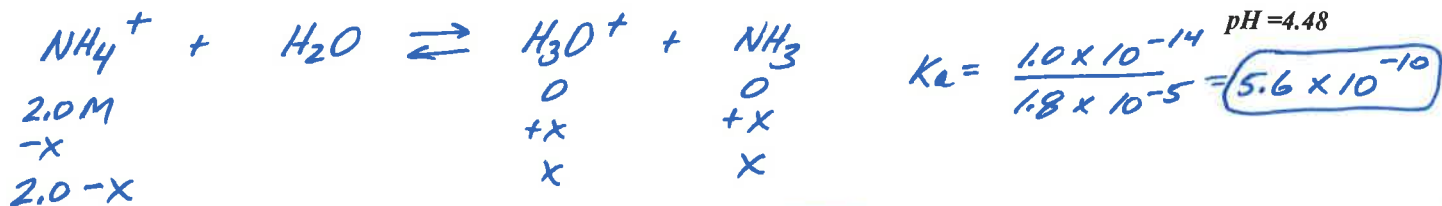
3. A student adds 9.7 grams of sulfamic acid ( $\text{H}_2\text{NH}_2\text{SO}_3$ ) crystals to 2.0 Liters of water. If the pH is 1.44, what is the acid dissociation constant,  $K_a$ , for sulfamic acid?

$$\frac{9.7}{97} = .10 \text{ moles H}_2\text{NH}_2\text{SO}_3 \quad \frac{.10}{2.0} = .050 \text{ M H}_2\text{NH}_2\text{SO}_3$$



4. What is the expected pH of a solution that was prepared by adding 53 grams of solid  $\text{NH}_4\text{Cl}$  to 0.50 Liters of distilled water? Assume the volume of the water does not change.

$$\text{NH}_4\text{Cl moles} = \frac{53}{53} = 1.0 \text{ mole} \quad \frac{1.0}{.50} = 2.0 \text{ M NH}_4\text{Cl}$$



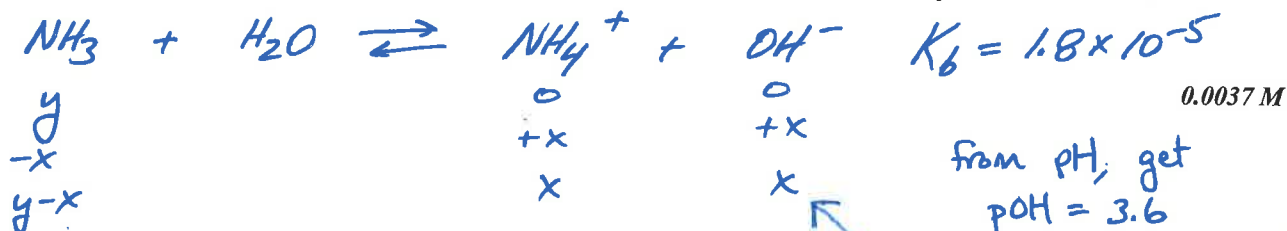
$$K_a = 5.6 \times 10^{-10} = \frac{x^2}{[2.0-x]}$$

$$x = 3.3 \times 10^{-5}$$

$$x = [\text{H}_3\text{O}^+] \\ \text{pH} = -\log[3.3 \times 10^{-5}]$$

$$\text{pH} = 4.48$$

5. A solution of  $\text{NH}_3$  was measured to have a pH of 10.4. What is the molarity of this solution?



from pH, get  
pOH = 3.6

$$[\text{OH}^-] = 2.5 \times 10^{-4} \text{ M}$$

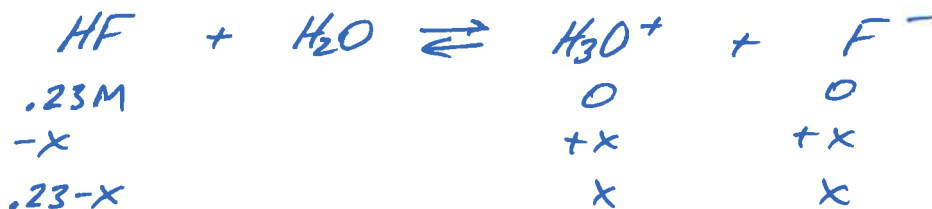
→  
This is my  
x-value

$$K_b = \frac{[2.5 \times 10^{-4}][2.5 \times 10^{-4}]}{[y - 2.5 \times 10^{-4}]} = 1.8 \times 10^{-5}$$

Bracken Guess = .1

$$y = .0037 \text{ M}$$

6. What percent of a 0.23 M solution of HF is ionized?



$$K_a = 6.8 \times 10^{-4} = \frac{x^2}{[.23-x]}$$

$$x = .012$$

$$\% \text{ ionization} = \frac{.012}{.23} \times 100 = 5.2\%$$