1. **(1 pt) mathbioLibrary/setABiocLabs/Lab121_C2_weak_acid.pg**
Because of the accuracy of WebWork, you should use 5 or 6 significant figures on all problems.

Acetic acid (CH_3COOH) is a weak acid with an equilibrium constant $K_a = 1.75e-05$. Use the techniques developed in class to find an expression for $[H^+]$ as a function of the normality, x, of the weak acid solution. This means that you need to solve the quadratic equation in $[H^+]$ using the quadratic formula, leaving x as a variable in this formula.

a. In your Lab report, write the expression for $[H^+]$ as a function of x using the value of $K_a = 1.75e-05$. Use Microsoft Equation 3.0 to write this expression.

b. When $x = 0.02$ N, find
$[H^+] =$ _____.
When $x = 0.3$ N, find
$[H^+] =$ _____.
When $x = 1.05$ N, find
$[H^+] =$ _____.
Also, when $[H^+] = 0.004$, find
$x =$ _____ N.

c. In your Lab report, create a graph of the $[H^+]$ as a function of the normality x for $x \in [0.001, 2]$. Be sure to properly label your axes.

d. The pH of a solution is given by

$$\text{pH} = -\log_{10}([H^+]).$$

When $x = 0.02$ N, find the
pH = _____.
When $x = 0.3$ N, find the
pH = _____.
When $x = 1.05$ N, find the
pH = _____.
Also, when the pH = 2.6, find
$x =$ _____ N.

e. In your Lab report, create a graph of the pH as a function of the normality x for $x \in [0.001, 2]$. Be sure to properly label your axes.