Finding the pH of Weak Acids

1) Find the pH of a 0.065 M solution of formic acid. The acid dissociation constant (K_a) for formic acid is 1.8×10^{-4}.

2) Find the pH of a 0.325 M acetic acid solution. $K_a = 1.8 \times 10^{-5}$.

3) Find the pH of a solution that contains 0.0034 M lactic acid ($K_a = 1.4 \times 10^{-4}$) and 0.056 M propionic acid ($K_a = 1.4 \times 10^{-5}$).

4) What is the pH of a 0.00056 M butyric acid solution. $pK_a = 4.82$.

Finding the pH of Weak Acids - Answers

1) Find the pH of a 0.065 M solution of formic acid. The acid dissociation constant (K_a) for formic acid is 1.8×10^{-4}.

2.47

2) Find the pH of a 0.325 M acetic acid solution. $K_a = 1.8 \times 10^{-5}$.

2.62

3) Find the pH of a solution that contains 0.0034 M lactic acid ($K_a = 1.4 \times 10^{-4}$) and 0.056 M propionic acid ($K_a = 1.4 \times 10^{-5}$).

To solve, find the amount of H^+ that each acid will donate to the solution separately, then add them together. The lactic acid will cause the H^+ concentration to be 6.90×10^{-4} M and the propionic acid will cause the H^+ concentration to be 8.85×10^{-4} M. When you add these together, you find the total H^+ concentration in the solution is 1.58×10^{-3} M. To find the pH, take the negative log of this number to get a pH of 2.80.

4) What is the pH of a 0.00056 M butyric acid solution. $pK_a = 4.82$.

$pK_a = -\log[K_a]$. Using this equation, the K_a of butyric acid is found to be 1.51×10^{-5}. When you solve this problem in the same way you solved the ones above, you find the pH of this solution is 4.04.