General Chemistry
Mr. MacGillivray
Quiz #38:
pH Calculations I

$pH = -\log[H_3O^+]$

$pOH = -\log[OH^-]$

$pOH + pH = 14$

$[H_3O^+] \times [OH^-] = 1.00 \times 10^{-14} \quad = K_w$

Solve each problem. Show all work.

Find the pH of the following solutions:

a) $[H_3O^+] = 0.010$ M $\quad -\log[0.01] = pH = 2.00$

b) [OH-] = 0.010 M $\quad -\log[0.01] = pOH = 2.00$
$pH = 14 - 2 = 12.00$

$pH = 14 - 8.77$
$= 5.23$

c) pOH = 8.77 ☹ oops →

~~$pOH = -\log[OH^-]$ $\quad 8.77 = -\log[OH^-]$ $\quad -8.77 = \log[OH^-]$~~
~~$\text{antilog}(-8.77) = 1.70 \times 10^{-9}$ M~~

Find the $[H_3O^+]$ of each of the following solutions:

a) pH = 8.00 $\quad -\log[H_3O^+] = 8$
$\log[H_3O^+] = -8$ $\quad \text{antilog}(-8) = 1.0 \times 10^{-8}$ M

b) pOH = 8.00
$pH = 14 - 8 = 6 \quad -\log[H_3O^+] = 6 \quad \log[H_3O^+] = -6$
$\text{antilog} -6 = 1.00 \times 10^{-6}$ M

c) $[OH^-] = 7.5 \times 10^{-3}$ M

$[H_3O^+] = \frac{1 \times 10^{-14}}{7.5 \times 10^{-3}} = 1.3 \times 10^{-12}$ M