Name KEY Period_____ Date_____

Acid and Bases – Calculations – 2a Assume completedissociation.

Please answer each of the following questions. Show all work to receive full credit.

1. A solution of 1.56×10^{-4} M nitric acid is made. HNO_3

What is the concentration of hydronium?

$[H_3O^+] = 1.56 \times 10^{-4}$ M

What is the hydroxide concentration?

$[OH^-] = \frac{1 \times 10^{-14}}{1.56 \times 10^{-4}} = 6.41 \times 10^{-11}$ M

What is the pH?

$-\log(1.56 \times 10^{-4}) = 3.81$

What is the pOH?

$14 - 3.81 = 10.19$

2. A 4.02×10^{-1} M solution of sodium hydroxide is made. $NaOH$

What is the concentration of hydronium?

$[H_3O^+] = \frac{1 \times 10^{-14}}{4.02 \times 10^{-1}} = 2.49 \times 10^{-14}$ M

What is the hydroxide concentration?

$[OH^-] = 4.02 \times 10^{-1}$ M

What is the pH?

$14 - .396 = 13.6$

What is the pOH?

$-\log(4.02 \times 10^{-1}) = .396$

3. A 8.51×10^{-7} M solution of phosphoric acid is made. H_3PO_4

What is the concentration of hydronium?

$[H_3O^+] = 3(8.51 \times 10^{-7}) = 2.55 \times 10^{-6}$ M

What is the hydroxide concentration?

$[OH^-] = \frac{1 \times 10^{-14}}{2.55 \times 10^{-6}} = 3.92 \times 10^{-9}$ M

What is the pH?

$-\log(2.55 \times 10^{-6}) = 5.59$

What is the pOH?

$14 - 5.59 = 8.41$

4. A 1.07×10^{-5} M solution of magnesium hydroxide solution is made. $Mg(OH)_2$

What is the concentration of hydronium?

$[H_3O^+] = \frac{1 \times 10^{-14}}{2.14 \times 10^{-5}} = 4.67 \times 10^{-10}$ M

What is the hydroxide concentration?

$[OH^-] = 2(1.07 \times 10^{-5}) = 2.14 \times 10^{-5}$ M

What is the pH?

$14 - 4.67 = 9.33$

What is the pOH?

$-\log(2.14 \times 10^{-5}) = 4.67$