Name : _____ Date : _____

Calculating pH Worksheet

1. Find the values of $[H^+]$, pOH, and $[OH^-]$ that correspond to each of the following pH values.

	$[H^+]$	$[OH^-]$	pOH
pH of lemon juice = 2.9			
pH of sauerkraut = 3.85			
pH of milk of magnesia = 10.81			
pH of orange juice = 4.11			
pH of diluted household ammonia = 11.61			

2. Determine which of the solutions in problem #2 are acidic.

3. What is the mass of NaOH required to prepare 100.0 mL of NaOH (aq) with a pH = 13.62 ?

4. In a solution at 25°C, the $[H_3O^+]$ is 3.5×10^{-6} M. Calculate the $[OH^-]$.

5. Calculate the $[H_3O^+]$ in a solution with a $[OH^-]$ of 1.5×10^{-4} M

6. The pH of pure water is 6.52 at 60°C. Calculate the $[OH^-]$

7. Calculate the pH of 0.25 M $Sr(OH)_2$

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Calculating pH Worksheet

1. Find the values of $[H^+]$, pOH, and $[OH^-]$ that correspond to each of the following pH values.

	$[H^+]$	$[OH^-]$	pOH
pH of lemon juice = 2.9	$10^{-2.9} = 0.0013$ M	$10^{-11.1} = 7.94 \times 10^{-12}$ M	14 - 2.9 = 11.1
pH of sauerkraut = 3.85	$10^{-3.85} = 1.41 \times 10^{-4}$ M	$10^{-10.5} = 7.08 \times 10^{-11}$ M	14 - 3.85 = 10.15
pH of milk of magnesia = 10.81	$10^{-10.81} = 1.5 \times 10^{-11}$ M	$10^{-3.19} = 6.46 \times 10^{-4}$ M	14 - 10.18 = 3.19
pH of orange juice = 4.11	$10^{-4.11} = 7.76 \times 10^{-5}$ M	$10^{-9.89} = 1.29 \times 10^{-10}$ M	14 - 4.11 = 9.89
pH of diluted household ammonia = 11.61	$10^{-11.61} = 2.45 \times 10^{-12}$ M	$10^{-2.39} = 0.0041$ M	14 - 11.61 = 2.39

2. Determine which of the solutions in problem #2 are acidic.

pH < 7 is acidic. They are lemon juice, sauerkraut, and orange juice

3. What is the mass of NaOH required to prepare 100.0 mL of NaOH (aq) with a pH = 13.62 ?

pOH = 14 – 13.62 = 0.38 pOH = 14 – 4.72 = 9.28

$[OH^-] = 10^{-0.38} = 0.42$ M

Mass of NaOH = 0.1 L x (0.042 mol/L) x (40 g/mol) = 1.7 g

4. In a solution at 25°C, the $[H_3O^+]$ is 3.5×10^{-6} M. Calculate the $[OH^-]$.

$[OH^-] = 1 \times 10^{-14} / 3.5 \times 10^{-6} = 2.9 \times 10^{-6}$ M

5. Calculate the $[H_3O^+]$ in a solution with a $[OH^-]$ of 1.5×10^{-4} M

$[H_3O^+] = 1 \times 10^{-14} / 1.5 \times 10^{-4} = 6.7 \times 10^{-11}$ M

6. The pH of pure water is 6.52 at 60°C. Calculate the $[OH^-]$

$[H_3O^+] = 10^{-6.25} = 3 \times 10^{-7}$ M

Since it is pure water, $[H_3O^+] = [OH^-] = 3 \times 10^{-7}$ M

7. Calculate the pH of 0.25 M $Sr(OH)_2$

$Sr(OH)_2\ (aq) \rightleftharpoons Sr^{2+}\ (aq) + 2\ OH^-\ (aq)$

pOH = -log $[OH^-]$ = -log (0.5) = 0.30

pH = 14 – 0.30 = 13.7