

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  $3.5 \times 10^{-6}$  M. Calculate the  $[OH^-]$ .

5. Calculate the  $[H_3O^+]$  in a solution with a  $[OH^-]$  of  $1.5 \times 10^{-4}$  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	$10^{-2.9} = 0.0013 \text{ M}$	$10^{-11.1} = 7.94 \times 10^{-12} \text{ M}$	$14 - 2.9 = 11.1$
pH of sauerkraut = 3.85	$10^{-3.85} = 1.41 \times 10^{-4} \text{ M}$	$10^{-10.5} = 7.08 \times 10^{-11} \text{ M}$	$14 - 3.85 = 10.15$
pH of milk of magnesia = 10.81	$10^{-10.81} = 1.5 \times 10^{-11} \text{ M}$	$10^{-3.19} = 6.46 \times 10^{-4} \text{ M}$	$14 - 10.18 = 3.19$
pH of orange juice = 4.11	$10^{-4.11} = 7.76 \times 10^{-5} \text{ M}$	$10^{-9.89} = 1.29 \times 10^{-10} \text{ M}$	$14 - 4.11 = 9.89$
pH of diluted household ammonia = 11.61	$10^{-11.61} = 2.45 \times 10^{-12} \text{ M}$	$10^{-2.39} = 0.0041 \text{ M}$	$14 - 11.61 = 2.39$

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 ?

$$\text{pOH} = 14 - 13.62 = 0.38$$

$$\text{pOH} = 14 - 4.72 = 9.28$$

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

$$\text{Mass of NaOH} = 0.1 \text{ L} \times (0.042 \text{ mol/L}) \times (40 \text{ g/mol}) = 1.7 \text{ g}$$

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

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

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

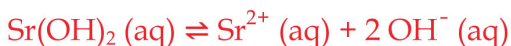
$$[H_3O^+] = 1 \times 10^{-14} / 1.5 \times 10^{-4} = 6.7 \times 10^{-11} \text{ M}$$

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

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

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

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



$$\text{pOH} = -\log [OH^-] = -\log (0.5) = 0.30$$

$$\text{pH} = 14 - 0.30 = 13.7$$