

Name :

—○ pH and pOH Worksheet ○—

1. Write the equation for the dissociation of hydrochloric acid.
2. Find the pH of a 0.00476 M hydrochloric acid solution.
3. Write the equation for the dissociation of sulfuric acid.
4. Find the pH of a solution that contains 3.25 g of H_2SO_4 dissolved in 2.75 liters of solution.
5. Write the equation for the dissociation of sodium hydroxide.
6. Find the pH of a 0.000841 M solution of sodium hydroxide.
7. Calculate the pH of a solution formed when 35 mL of 1.00 M HCl is mixed with 175 mL of 0.25 M NaOH.

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—○ pH and pOH Worksheet ○—

1. Write the equation for the dissociation of hydrochloric acid.



2. Find the pH of a 0.00476 M hydrochloric acid solution.

$$\text{pH} = -\log [\text{H}^+] = -\log (0.00476) = 2.32$$

3. Write the equation for the dissociation of sulfuric acid.



4. Find the pH of a solution that contains 3.25 g of H_2SO_4 dissolved in 2.75 liters of solution.

$$\text{Number of moles} = (3.25 \text{ g} / 98 \text{ g/mol}) = 0.0332 \text{ mol}$$

$$\text{Molarity, M} = (0.0332 \text{ mol} / 2.75 \text{ L}) = 0.0121 \text{ M}$$

$$[\text{H}^+] = 2 \times 0.0121 = 0.0242 \text{ M}$$

$$\text{pH} = -\log (0.0242) = 1.6$$

5. Write the equation for the dissociation of sodium hydroxide.



6. Find the pH of a 0.000841 M solution of sodium hydroxide.

$$[\text{OH}^-] = 0.000841 \text{ M}$$

$$\text{pOH} = -\log [\text{OH}^-] = -\log (0.000841) = 3.08$$

$$\text{pH} = 14 - 3.08 = 10.9$$

7. Calculate the pH of a solution formed when 35 mL of 1.00 M HCl is mixed with 175 mL of 0.25 M NaOH.

$$\text{Moles of HCl} = \text{Volume} \times \text{Molarity} = 35 \text{ mL} \times 1.00 \text{ M} = 0.035 \text{ mol}$$

$$\text{Moles of NaOH} = 175 \text{ mL} \times 0.25 \text{ M} = 0.04375 \text{ mol}$$

$$\text{Excess moles of NaOH} = 0.04375 \text{ mol} - 0.035 \text{ mol} = 0.00875 \text{ mol}$$

$$\text{Total volume} = 35 \text{ mL} + 175 \text{ mL} = 210 \text{ mL} = 0.21 \text{ L}$$

$$\text{Concentration of excess NaOH, } [\text{OH}^-] = 0.21 \text{ L} / 0.00875 \text{ mol} = 0.0417 \text{ M}$$

$$\text{pOH} = -\log [\text{OH}^-] = -\log (0.0417) = 1.38$$

$$\text{pH} = 14 - 1.38 = 12.62$$