

pH Practice Worksheet

- 1) What is the pH of a solution that contains 25 grams of hydrochloric acid (HCl) dissolved in 1.5 liters of water?
- 2) What is the pH of a solution that contains 1.32 grams of nitric acid (HNO₃) dissolved in 750 mL of water?
- 3) What is the pH of a solution that contains 1.2 moles of nitric acid (HNO₃) and 1.7 moles of hydrochloric acid (HCl) dissolved in 1000 liters of water?
- 4) If a solution has a [H⁺] concentration of 4.5×10^{-7} M, is this an acidic or basic solution? Explain.
- 5) An acidic solution has a pH of 4. If I dilute 10 mL of this solution to a final volume of 1000 mL, what is the pH of the resulting solution?

Solutions for the pH practice worksheet:

The important thing to remember for all of these problems is that $\text{pH} = -\log [\text{H}^+]$, and that $[\text{H}^+]$ is equivalent to the molarity of acid present in a solution. When the pH is less than 7, the solution is acidic, when the pH = 7 it is neutral, and when it is greater than 7, it is basic.

- 1) In this problem, there are 0.685 moles of HCl dissolved in 1.5 L H_2O , making a total acid concentration of 0.457 M. To find the answer, take the negative log of this to find that the $\text{pH} = 0.34$
- 2) $\text{pH} = 1.55$
- 3) $\text{pH} = 2.53$
- 4) The pH of this solution is 6.35, making the solution very slightly acidic.
- 5) The pH will be 6. This is solved in the same way that dilution problems are solved. If the $\text{pH} = 4$, this means that the concentration of $[\text{H}^+]$ present is 0.0001 M. When you use the dilution equation, $M_1V_1 = M_2V_2$, where V_2 is 1000 mL, you find that the concentration of acid after dilution is 1.00×10^{-6} , which corresponds to a final pH of 6.