

19

ACIDS, BASES, AND SALTS**Practice Problems**

In your notebook, solve the following problems.

SECTION 19.1 ACID–BASE THEORIES

- Identify the hydrogen ion donor(s) and hydrogen ion acceptor(s) for ionization of H_2SO_4 in water. Label the conjugate acid–base pairs.
- Identify all of the ions that may be formed when H_3PO_4 ionizes in water.
- Classify the following acids as monoprotic, diprotic, or triprotic.
 - HCOOH
 - HBr
 - H_2SO_3
 - H_3ClO_4
- What would you expect to happen when lithium metal is added to water? Show the chemical reaction.
- In the following chemical reaction, identify the Lewis acid and base.

$$\text{BF}_3 + \text{F}^- \rightleftharpoons \text{BF}_4^-$$
- Describe some distinctive properties of acids.
- Describe some distinctive properties of bases.

SECTION 19.2 HYDROGEN IONS AND ACIDITY

- A solution has a hydrogen ion concentration of $1 \times 10^{-6}M$. What is its pH?
- What is the pH of a solution if the $[\text{H}^+] = 7.2 \times 10^{-9}M$?
- What is the pOH of a solution if the $[\text{OH}^-] = 3.5 \times 10^{-2}M$?
- What is the pOH of a solution that has a pH of 3.4?
- Classify each solution as acidic, basic, or neutral.
 - $[\text{H}^+] = 2.5 \times 10^{-9}M$
 - $\text{pOH} = 12.0$
 - $[\text{OH}^-] = 9.8 \times 10^{-11}M$
 - $[\text{H}^+] = 1 \times 10^{-7}M$
 - $\text{pH} = 0.8$
- Calculate the pH of each solution.
 - $[\text{H}^+] = 1 \times 10^{-5}M$
 - $[\text{H}^+] = 4.4 \times 10^{-11}M$
 - $[\text{OH}^-] = 2.2 \times 10^{-7}M$
 - $\text{pOH} = 1.4$
- Classify the solutions in problem 6 as acidic or basic.
- Why is there a minus sign in the definition of pH?
- A solution has a pOH of 12.4. What is the pH of this solution?
- What is the pH of a solution with $[\text{H}^-] = 1 \times 10^{-3}M$?