Assignment 12.1 Acid and Bases

1. What is the difference between cations and anions?

2. What is an acid, as defined by Arrhenius? What are 3 of its characteristics?

3. What is an base, as defined by Arrhenius? What are 3 of its characteristics?

4. What is an acid, as defined by Bronsted-Lowry model? A base?

5. In your own words, explain how hydrogen ions and hydronium ions relate to each other.

6. How do the following acids dissociate in water? (a) is done for you.
   a. $\text{HNO}_3 \rightarrow \text{H}^+ + \text{NO}_3^-$
   b. $\text{HCl} \rightarrow$
   c. $\text{H}_2\text{SO}_4 \rightarrow$
   d. $\text{H}_2\text{CO}_3 \rightarrow$

7. How do the following bases dissociate in water? (a) is done for you.
   a. $\text{NaOH} \rightarrow \text{Na}^+ + \text{OH}^-$
   b. $\text{Ca(OH)}_2 \rightarrow$
   c. $\text{Mg(OH)}_2 \rightarrow$
   d. $\text{LiOH} \rightarrow$

8. Label the acid, base, conjugate acid, conjugate base in the following reactions
   a. $\text{HF} + \text{H}_2\text{O} \rightarrow \text{F}^- + \text{H}_3\text{O}^+$
   b. $\text{CN}^- + \text{H}_2\text{O} \rightarrow \text{HCN} + \text{OH}^-$
   c. $\text{NH}_4 + \text{H}_2\text{O} \rightarrow \text{NH}_3 + \text{H}_3\text{O}^+$

9. In your own words, what is the difference between a strong and weak acid?