PROPERTIES OF ACIDS AND BASES
1. Acids taste ___________ and bases taste ______________, bases also feel ______________.
2. Acids turn litmus paper __________, bases turn litmus paper __________ and phenolphthalein ________.
3. Circle: Weak acids are strong / weak electrolytes. A weak electrolyte is a poor / good conductor of electricity.

REACTIONS OF ACIDS AND BASES
4. The definitions of a Brønsted-Lowry acid is: ________________________________

Identify the Brønsted-Lowry Acid & Base, and also the conjugate acid and conjugate base in each reaction:

5. \( \text{NH}_3(\text{g}) + \text{H}_2\text{O}(\text{l}) \rightleftharpoons \text{NH}_4^+(\text{aq}) + \text{OH}^-(\text{aq}) \)

   __________  __________  __________  __________

6. \( \text{HClO}_3(\text{aq}) + \text{H}_2\text{O}(\text{l}) \rightleftharpoons \text{H}_3\text{O}^+(\text{aq}) + \text{ClO}_3^-(\text{aq}) \)

   __________  __________  __________  __________

7. \( \text{HF}(\text{aq}) + \text{HSO}_3^-(\text{aq}) \rightleftharpoons \text{F}^-(\text{aq}) + \text{H}_2\text{SO}_3(\text{aq}) \)

   __________  __________  __________  __________

8. The product of an Arrhenius acid and base neutralization are a/an _________________ and ________________.

Complete and balance the following reactions:

9. \( ____ \text{HBr} + ____ \text{NaOH} \rightarrow _________________ + _________________ \)

10. \( ____ \text{H}_2\text{SO}_4 + ____ \text{KOH} \rightarrow _________________ + _________________ \)

11. \( ____ \text{HCl} + ____ \text{Ca(OH)}_2 \rightarrow _________________ + _________________ \)

12. \( ____ \text{Fe(OH)}_3 + ____ \text{H}_2\text{SO}_4 \rightarrow _________________ + _________________ \)

NAMING ACIDS & BASES:
13. What is the correct formula for nitrous acid? _________________

14. What is the correct formula for hydrobromic acid? _________________

15. What is the correct name for \( \text{H}_3\text{PO}_3 \)? _________________

16. What is the correct name for \( \text{HNO}_3 \)? _________________

17. What is the correct formula for bromic acid? _________________

18. What is the correct name for \( \text{H}_2\text{SO}_4 \)? _________________

19. What is the formula for aluminum hydroxide? _________________

20. What is the correct name for \( \text{Sr(OH)}_2 \)? _________________

21. What is the correct name for \( \text{Cu(OH)}_2 \)? _________________

22. What is the formula for iron (III) hydroxide? _________________

(continued on back)
Complete the following table by filling in the empty spaces. Indicate if the solution is acidic, basic or neutral. You should be able to do the starred (*) items without a calculator. (Problem #23-34)

<table>
<thead>
<tr>
<th>[H₃O]⁺</th>
<th>[OH⁻]</th>
<th>pH</th>
<th>pOH</th>
<th>Acidic/Basic/Neutral</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.35 × 10⁻³</td>
<td>4.93 × 10⁻⁸</td>
<td>8.320</td>
<td>10.270</td>
<td></td>
</tr>
<tr>
<td>3.72 × 10⁻¹⁰</td>
<td>*1.00 × 10⁻⁷</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>*1.00 × 10⁻³</td>
<td>4.27 × 10⁻²</td>
<td>*8.000</td>
<td>2.040</td>
<td></td>
</tr>
</tbody>
</table>

Complete the following problems which require more than a single step. **SHOW YOUR WORK & STEPS**

35. Given a solution with a hydroxide ion concentration, [OH⁻] = 2.73 × 10⁻⁵, what is the pH?

36. A solution is found to have a pH of 8.3. What is the hydroxide ion, [OH⁻], concentration?

37. The measured pOH of a solution is 5.5. What is the hydrogen ion, [H⁺], concentration?

**BONUS QUESTION:** (all work above must be complete before attempting the bonus)

You are stuck with a problem. You need to measure pH of a solution known to be made from a metal hydroxide, but you don’t have a meter or any indicators. You do happen to have some lead (II) nitrate that is soluble, and you remember that lead (II) hydroxide is insoluble. You add some to 1 liter of your unknown solution and a precipitate forms. You add more until the precipitate stops forming and then a bit more just in case. After you filter and dry the precipitate, you have 3.81 grams of it. What was the approximate pH of the original solution? **SHOW YOUR STEPS AND YOUR WORK.** EXPLAIN EACH STEP SO I KNOW WHAT YOU DID.