DOUBLE DISPLACEMENT MADNESS !!!

Complete the following problems on a *separate* sheet of paper. Be sure to show ALL of your work.

1. When the following solutions are mixed together, what precipitate, if any, will form?
   a. $BaCl_2(aq) + Na_2SO_4(aq)$ ------->
   b. $Pb(NO_3)_2(aq) + KCl(aq)$ -------->
   c. $AgNO_3(aq) + Na_3PO_4(aq)$-------->
   d. $NaOH(aq) + Fe(NO_3)_3(aq)$-------->

2. When the following solutions are mixed together, what precipitate, if any, will form?
   a. $CuCl_2(aq) + Na_2S(aq)$ ---------->
   b. $NiSO_4(aq) + KOH(aq)$ ---------->
   c. $KOH(aq) + NaNO_3(aq)$ ---------->
   d. $NaOH(aq) + MnSO_4(aq)$ ---------->

3. For the reactions in problem #1, write the balanced molecular equation, complete ionic equation, and net ionic equation. If no precipitate forms, write "NO REACTION" (know your solubility rules).

4. For the reaction in problem #2, write the balanced molecular equation, complete ionic equation, and net ionic equation. If no precipitate forms, write "NO REACTION" (once again, you must know your solubility rules).

5. Write net ionic equations for the following:
   a. $AgNO_3(aq) + KI(aq)$ ---------->
   b. $CuSO_4(aq) + Na_2S(aq)$ ---------->
   c. $CoCl_2(aq) + NaOH(aq)$ ---------->
   d. $NiCl_2(aq) + KNO_3(aq)$ ---------->

6. Write net ionic equations for the following:
   a. $AgNO_3(aq) + BaCl_2(aq)$ ---------->
   b. $FeSO_4(aq) + K_2S(aq)$ ---------->
   c. $NaOH(aq) + K_2SO_4(aq)$ ---------->
   d. $Hg_2(NO_3)_2(aq) + CaCl_2(aq)$ ---------->

7. Write net ionic equations for the reaction, if any, that occur when aqueous solutions of the following are mixed.
   a. ammonium sulfate and barium nitrate
   b. lead(II) nitrate and sodium chloride
   c. sodium phosphate and potassium nitrate
   d. sodium bromide and rubidium chloride
   e. copper(II)chloride and sodium hydroxide

8. Write net ionic equations for the reaction, if any, that occur when aqueous solutions of the following are mixed.
   a. iron(III)nitrate and sodium hydroxide
   b. cadmium chloride and sodium sulfide (cadmium only forms Cd^{2+} ions)
   c. silver nitrate and rubidium bromide
   d. copper(II)chloride and calcium hydroxide

9. A lake may be polluted with Pb^{2+} ions. What precipitation reaction might you use to test for the presence of Pb^{2+}?

10. A sample may contain any or all of the following ions; Hg_2^{2+}, Ba^{2+}, and Mn^{2+}. No precipitate formed when an aqueous solution of NaCl or Na_2SO_4 was added to the sample solution. A precipitate formed when the sample solution was made basic with NaOH. Which ion or ions are present in the sample solution?

11. Balance the following equations and write the corresponding ionic and net ionic equations (if appropriate (i.e. if the reaction creates a precipitate, water, or gas)).
   a. $HBr(aq) + NH_3(aq)$ ---------->
   b. $Ba(OH)_2(aq) + H_3PO_4(aq)$---------->
   c. $HClO_4(aq) + Mg(OH)_2(aq)$ ---------->
   d. $CH_3COOH(aq) + KOH(aq)$ ---------->

   Be on the alert for gas forming reactions. When in doubt, consult your book or your notes!

   e. $NH_4Cl(aq) + NaOH(aq)$ ---------->
   f. $Na_2CO_3(aq) + HCl(aq)$ ---------->
   g. $Li_2SO_3(aq) + HBr(aq)$ ---------->