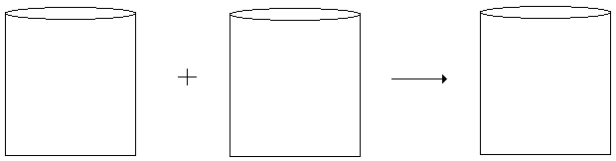
General steps for solving stoichiometric problems involving solutions:

1. Write the balanced equation for the reaction. For reactions involving ions, it is best to write the net ionic equation.
2. Calculate the moles of reactants.
3. Determine which reactant is limiting, if required.
4. Calculate the moles of other reactants or products, as required.
5. Convert to grams or other units, if required.

Solution Stoichiometry Example 1

1. When lead(II) nitrate and potassium iodide are mixed, what precipitate will form?

   $Pb(NO_3)_{2(aq)} + KI_{(aq)} \rightarrow$



2. What volume of a 0.100 *M* KI solution is needed to completely react with 100.0 mL of a 0.100 *M* $Pb(NO_3)_2$ solution?

3. What is the mass of solid produced?

4. What are the concentrations of the ions left in solution after the reaction is complete?

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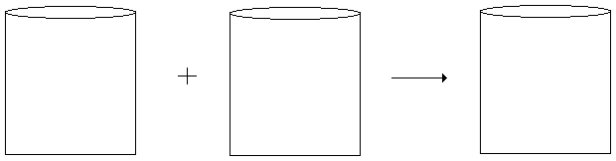
Solution Stoichiometry Example 2

1. Same reaction (and volumes) but different starting amounts in moles: 100.0 mL of 0.0100 mol $Pb(NO_3)_2$ reacts with 200. mL of 0.0500 mol KI.

$$Pb(NO_3)_{2(aq)} + 2KI_{(aq)} \rightarrow PbI_{2(s)} + 2KNO_{3(aq)}$$



2. What is the mass of solid produced?

3. What are the concentrations of the ions left in solution after the reaction is complete?