1. You have a 0.50 mM solution of sodium phosphate.

   A) Determine the concentration of sodium ions and phosphate ions in this solution.

   B) If you want to dilute 1.0 mL of the 0.5 mM sodium phosphate solution to 5.0 μM, how much water must be added to the original solution?

2. Consider the following four aqueous solutions:

   $KNO_3$ $Mg(NO_3)_2$ $Ca(NO_3)_2$ $NH_4NO_3$

   A) Which of the aqueous solutions would produce a precipitate when added to an aqueous solution of sodium sulfate?

   B) Write the balanced net ionic equation for the precipitation reaction in part A.

3. Determine the mass of solid precipitate formed when an excess lead(II) nitrate solution is mixed with 0.0800 mol sodium chloride.

4. Consider the following unbalanced reaction:

$$Cr_2O_7^{2-}(aq) + SO_3^{2-}(aq) \rightarrow Cr^{3+}(aq) + SO_4^{2-}(aq)$$

A) Determine the oxidation states for the specified atoms.

Cr in $Cr_2O_7^{2-}$ _____ S in $SO_3^{2-}$ _____ S in $SO_4^{2-}$ _____

O in $Cr_2O_7^{2-}$ _____ O in $SO_3^{2-}$ _____ O in $SO_4^{2-}$ _____

B) Balance the above reaction using the half-reaction method in acidic aqueous solution.

5. A titration is performed where 48.0 mL of 1.00 M HCl is needed to react completely with 20.0 mL of a LiOH solution with unknown concentration.

What is the concentration of the unknown LiOH solution?