Name	AP Chemistry
	er 15 HW #3: Due 12/10/19 Complete both free response questions. One will be graded. Show all Box and clearly label all final answers
(a) A sat PbCl <sub>2</sub> is (b) A sat concentr (c) Solid molar co	were the following questions that relate to solubility of salts of lead and barium.  Figurated solution is prepared by adding excess PbCl <sub>2</sub> ( $s$ ) to distilled water to form 1.0 L of solution at 25°C. The solubility of found to be 0.4415 grams/100. ml H <sub>2</sub> O. The chemical equation for the dissolution of PbCl <sub>2</sub> ( $s$ ) in water is shown below.  PbCl <sub>2</sub> ( $s$ ) $\rightleftharpoons$ Pb <sup>2+</sup> ( $aq$ ) + 2Cl <sup>-</sup> ( $aq$ )  (i) Write the equilibrium-constant expression for the equation.  (ii) Calculate the molar concentration of Cl <sup>-</sup> ( $aq$ ) in the solution.  (iii) Calculate the value of the equilibrium constant, K <sub>sp</sub> . urated solution is prepared by adding PbCl <sub>2</sub> ( $s$ ) to distilled water to form 4.0 L of solution at 25°C. What are the molar ations of Pb <sup>2+</sup> ( $aq$ ) and Cl <sup>-</sup> ( $aq$ ) in the solution? Justify your answer.  NaCl is added to a saturated solution of PbCl <sub>2</sub> at 25°C. Assuming that the volume of the solution does not change, does the neentration of Pb <sup>2+</sup> ( $aq$ ) in the solution increase, decrease, or remain the same? Justify your answer.  Falue of K <sub>sp</sub> for the salt BaSO <sub>4</sub> is 1.5 × 10 <sup>-9</sup> .  (i) When a 117.0 mL sample of 2.16 × 10 <sup>-2</sup> $M$ Ba(NO <sub>3</sub> ) <sub>2</sub> is added to 229.0 mL of 5.19 × 10 <sup>-2</sup> $M$ Na <sub>2</sub> SO <sub>4</sub> does a precipitate form (you must justify with calculations).  (ii) Calculate the concentration of the Ba <sup>2+</sup> at equilibrium.

<ul> <li>#2. Answer the following questions about the solubility of the salts Li₃PO₄ and PbCl₂. Assume that hydrolysis effects are negligible. The equation for the dissolution of Li₃PO₄(s) is shown below.</li> <li>Li₃PO₄(s) ⇒ 3 Li⁺(aq) + PO₄³⁻(aq) K₅p = 3.2 × 10⁻⁰ at 25°C</li> <li>(a) Write the equilibrium-constant expression for the dissolution of Li₃PO₄(s).</li> <li>(b) Assuming that volume changes are negligible, calculate the maximum number of moles of Li₃PO₄(s) that can dissolve in <ul> <li>(i) 0.50 L of water at 25°C</li> <li>(ii) 0.50 L of 0.20 M LiNO₃ at 25°C</li> </ul> </li> <li>The equation for the dissolution of PbCl₂ is shown below.</li> <li>PbCl₂(s) ⇒ Pb²⁺(aq) + 2 Cl⁻(aq) K₅p = 1.6 × 10⁻⁵ at 25°C</li> <li>(c) Calculate the concentration of Cl⁻(aq) in a saturated solution of PbCl₂ at 25°C. Calculate the minimum volume of water, in mL, that must evaporate from the container before solid PbCl₂ can precipitate.</li> </ul>		