1. One liter of saturated silver chloride solution contains 0.00192 g of dissolved AgCl at 25°C. Calculate Ksp for AgCl.

\[ \text{AgCl}(s) \rightleftharpoons \text{Ag}^+(aq) + \text{Cl}^-(aq) \]

2. One liter of saturated calcium fluoride solution contains 0.0167 g of dissolved CaF$_2$ at 25°C. Calculate Ksp for CaF$_2$.

\[ \text{CaF}_2(s) \rightleftharpoons \text{Ca}^{2+}(aq) + 2 \text{F}^-(aq) \]
3. Calculate the concentration of Hg$_2^{2+}$ in a solution saturated with Hg$_2$Cl$_2$ 
Ksp = 1.2 x 10$^{-18}$.

**Common Ion Effect**

4. Calculate the concentration of Hg$_2^{2+}$ in a solution already containing 0.030 M NaCl saturated with Hg$_2$Cl$_2$. WHAT DO YOU CONCLUDE FROM THIS?

Ksp = 1.2 x 10$^{-18}$.

**Reaction Quotient**

5. What would occur if the Hg$_2^{2+}$ concentration in #4 was 5.0 x 10$^{-10}$ M and the Cl$^-$ concentration remained the same?
Selective Precipitation

5. Is it possible to perform a 99% separation of 0.010 M Ca$^{2+}$ from 0.010 M Ce$^{3+}$ by precipitation with C$_2$O$_4^{2-}$?

CaC$_2$O$_4$  $K_{sp} = 1.3 \times 10^{-8}$
Ce$_2$(C$_2$O$_4$)$_3$ $K_{sp} = 3.0 \times 10^{-29}$

HINTS:
1. Which is least soluble? Therefore, which salt will precipitate at the lowest oxalate concentration?

2. What concentration of C$_2$O$_4^{2-}$ is needed to reduce Ce$^{3+}$ or Ca$^{2+}$ to 1% of 0.010M? (Use the one that is least soluble – the answer to #1)

3. Will the concentration of C$_2$O$_4^{2-}$ found in #2 precipitate the other species?  
HINT: find Q