6. The polyatomic ion $\text{C}_{10}\text{H}_{12}\text{N}_{2}\text{O}_{8}^{4-}$ is commonly abbreviated as EDTA$^{4-}$. The ion can form complexes with metal ions in aqueous solutions. A complex of EDTA$^{4-}$ with Ba$^{2+}$ ion forms according to the equation above. A 50.0 mL volume of a solution that has an EDTA$^{4-}(aq)$ concentration of 0.30 $M$ is mixed with 50.0 mL of 0.20 $M$ Ba(NO$_3$)$_2$ to produce 100.0 mL of solution.

(a) Considering the value of $K$ for the reaction, determine the concentration of Ba(EDTA)$^{2-}(aq)$ in the 100.0 mL of solution. Justify your answer.

(b) The solution is diluted with distilled water to a total volume of 1.00 L. After equilibrium has been reestablished, is the number of moles of Ba$^{2+}(aq)$ present in the solution greater than, less than, or equal to the number of moles of Ba$^{2+}(aq)$ present in the original solution before it was diluted? Justify your answer.

$$\text{Ba}^{2+}(aq) + \text{EDTA}^{4-}(aq) \rightleftharpoons \text{Ba(EDTA)}^{2-}(aq) \quad K = 7.7 \times 10^7$$