Name: _____

Equilibrium Calculations

1. Complete the expression s for changes in concentrations for each of the following reactions.
   a. $2\ SO_2\ (g) + O_2\ (g) \rightleftharpoons 2\ SO_3\ (g)$

      $x = \Delta[O_2]$ $\Delta[SO_2] =$ _____ $\Delta[SO_3] =$ _____

   b. $C_4H_8\ (g) \rightleftharpoons 2\ C_2H_4\ (g)$

      $-2x = \Delta[C_2H_4]$ $\Delta[C_4H_8] =$ _____

   c. $4\ NH_3\ (g) + 7\ O_2\ (g) \rightleftharpoons 4\ NO_2\ (g) + 6\ H_2O\ (g)$

      $\Delta[NH_3] =$ _____ $\Delta[O_2] =$ _____ $\Delta[NO_2] =$ _____ $\Delta[H_2O] =$ _____

2. When 1.00 mole of each of ethanol C_2H_5OH and acetic acid CH_3CO_2H react in 1.00 L of solution with acid catalysis in the solvent dioxane, they combine to produce ethyl acetate $CH_3CO_2C_2H_5$ and water. Equilibrium is reached when 1/3 mol of each of the reactants remains. Use an ICE table to calculate the equilibrium constant for the reaction. (Water is a solute in this reaction, not a solvent.)

	C_2H_5OH	**CH_3CO_2H**	**$CH_3CO_2C_2H_5$**	**H_2O**
Initial				
Change				
Equilibrium				

   What is the equilibrium constant?

3. Under certain conditions, the equilibrium constant *K* for the decomposition of PCl_5 (g) into PCl_3 (g) and Cl_2 (g) is 0.0211. What are the equilibrium concentrations of PCl_5, PCl_3, and Cl_2 in a mixture that initially contained only PCl_5 at a concentration of 1.00 M?