1. Several reaction mixtures containing only N_2O_4 and NO_2 were allowed to come to equilibrium at 25 °C. The equilibrium concentrations of the species in each experiment are as follows:

Exp #	$[N_2O_4]_{eq}$ (M)	$[NO_2]_{eq}$ (M)
1	0.5307	0.0495
2	1.114	0.0717
3	0.7456	0.0587
4	0.679	0.056

What is the equilibrium constant for the following reaction? Show that the same value for K_{eq} is obtained from each of the experiments.

$$N_2O_4(g) \rightleftharpoons 2\ NO_2(g)$$

*** Check with Dr. Fantini that you have the right value for question 1 before continuing. ***

2. What is the equilibrium constant for the following equation at 25 °C?

$$2\ NO_2(g) \rightleftharpoons N_2O_4(g)$$

3. What is the equilibrium constant for the following equation at 25 °C?

$$NO_2(g) \rightleftharpoons {}^1/_2\ N_2O_4(g)$$

4. For a mixture of N_2O_4 and NO_2 that is known to be at equilibrium at 25 °C, only the $[NO_2]$ was measured. What is $[N_2O_4]$ at equilibrium if the $[NO_2] = 0.0098$ M?