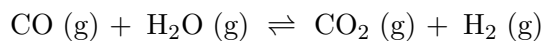Name and Block:_____

> Analyze the data below following the question prompts.

Hydrogen gas can be created at an industrial scale by reacting carbon monoxide gas and water vapor at high temperatures as represented in the reversible chemical equation shown below.

$$CO\ (g) +\ H_2O\ (g)\ \rightleftharpoons\ CO_2\ (g) +\ H_2\ (g)$$

The data in the table below describe the results of four experiments in which different quantities of H_2O gas, CO, H_2, and CO_2 are injected into a sealed reaction container heated to $227\,°C$.

Experiment	Initial and Equilibrium Concentrations of the Reactants and Products in the Water-Gas Shift Reaction $[H_2O(g) + CO(g) \rightleftharpoons H_2(g) + CO_2(g)]$ at 500 K							
	INITIAL CONCENTRATION (*M*)				EQUILIBRIUM CONCENTRATION (*M*)			
	[H₂O]	[CO]	[H₂]	[CO₂]	[H₂O]	[CO]	[H₂]	[CO₂]
1	0.0200	0.0200	0	0	0.0034	0.0034	0.0166	0.0166
2	0	0	0.0200	0.0200	0.0034	0.0034	0.0166	0.0166
3	0.0100	0.0200	0.0300	0.0400	0.0046	0.0146	0.0354	0.0454
4	0.0200	0.0100	0.0200	0.0100	0.0118	0.0018	0.0282	0.0182

1. Sketch approximate *Concentration v Time* graphs for each experiment.

2. Describe any patterns you notice with the data.

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3. Write the **mass action expression**, also referred to as the **equilibrium constant expression** for this chemical reaction.

4. Calculate the **equilibrium constant** for each of the experiments.

5. Describe what you notice about the value of **K** for each experiment. Explain what this is telling us about this chemical reaction.

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