

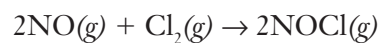
METHOD OF INITIAL RATES

NAME _____

SECTION _____

1. Define the terms *rate expression* and *rate law* for a chemical reaction.

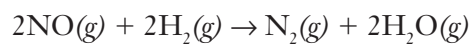
2. Write the general rate law for the following reaction



Identify the rate constant in the rate law. What are the exponents in the rate law called?

3. What experimental data is needed to determine the order of a chemical reaction?

4. a. Consider the reaction



and the following initial rate data.

Experiment Number	P _{NO} (mmHg)	P _{H₂} (mmHg)	Initial Rate $\left(\frac{\text{mmHg}}{\text{s}}\right)$
1	400	150	0.66
2	400	300	1.34
3	150	400	0.25
4	300	400	1.03

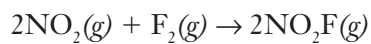
i. Determine the reaction order for NO and H₂.

ii. Determine the overall order of the reaction.

iii. Write the specific rate law for the reaction.

iv. Determine the rate constant for the reaction (include units).

b. The following initial rate data were collected for the reaction at 100 °C.



Exp.	[NO ₂]	[F ₂]	Initial Rate (M/sec)
1	0.0482 M	0.0318 M	1.90×10^{-3}
2	0.0120 M	0.0315 M	4.69×10^{-4}
3	0.0480 M	0.127 M	7.57×10^{-3}

i. Determine the reaction order for NO₂ and F₂.

ii. Determine the overall order of the reaction.

iii. Write the specific rate law for the reaction.