Worksheet 6: Differential Rate Laws

1. Write down the form of the rate law equation for two reactants A and B.

2. Write the ratio of two of these equations when there are different amounts of A but the same amount of B. You can use rate_1 and (A_1) for one equation and rate_2 and (A_2) for the other.

3. Manipulate the equation from the previous part to solve for the order of A.

4. Use the equation derived above and the table below to obtain the rate law for the reaction $2\,\text{NO}\,(\text{g}) + \text{Cl}_2(\text{g}) \longrightarrow 2\,\text{NOCl}\,(\text{g})$. Remember to include the proper units for the rate constant.

Trial	$(\text{NO})_0$ [M]	$(\text{Cl}_2)_0$ [M]	Initial Rate [M/s]
1	0.10	0.10	3.00×10^{-3}
2	0.10	0.15	4.50×10^{-3}
3	0.15	0.10	6.75×10^{-3}

5. What is the overall order for this reaction?

6. Calculate the rate of reaction when the initial concentration of NO is 0.65 M and that of Cl_2 is 1.10 M.

7. What will be the rate of production of NOCl for the initial concentrations given in the previous problem?