Chemical Kinetics

Consider the decomposition of N_2O_5 to give NO_2 and O_2:

$$2N_2O_5(g) \rightarrow 4NO_2(g) + O_2(g)$$

Time (s)	Concentration (M)		
	N_2O_5	NO_2	O_2
0	0.0200	0	0
100	0.0169	0.0063	0.0016
200	0.0142	0.0115	0.0029
300	0.0120	0.0160	0.0040
400	0.0101	0.0197	0.0049
500	0.0086	0.0229	0.0057
600	0.0072	0.0256	0.0064
700	0.0061	0.0278	0.0070

Derive the rate law for the reaction

$$A+B+C \rightarrow \text{products}$$

from the following data, where rate is measured as soon as the reactants are mixed.

Experiment	1	2	3	4
[A]o	0.100	0.200	0.200	0.100
[B]o	0.100	0.100	0.300	0.100
[C]o	0.100	0.100	0.100	0.400
rate	0.100	0.800	7.200	0.400

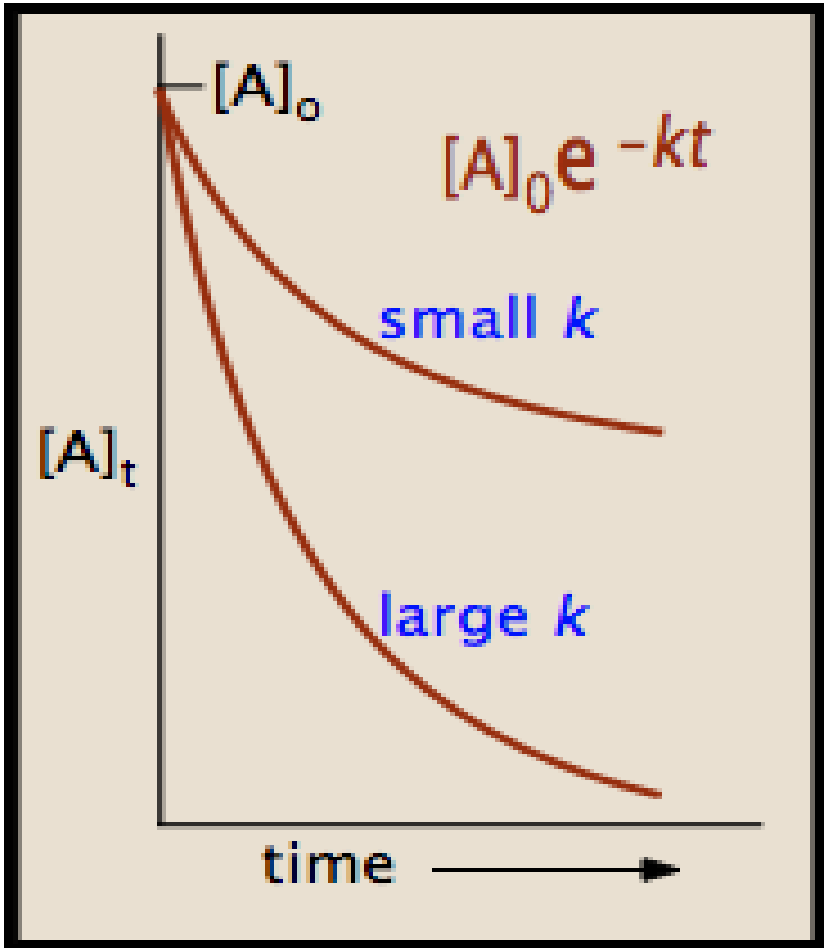
The reaction of nitric oxide with hydrogen at 1280°C is:

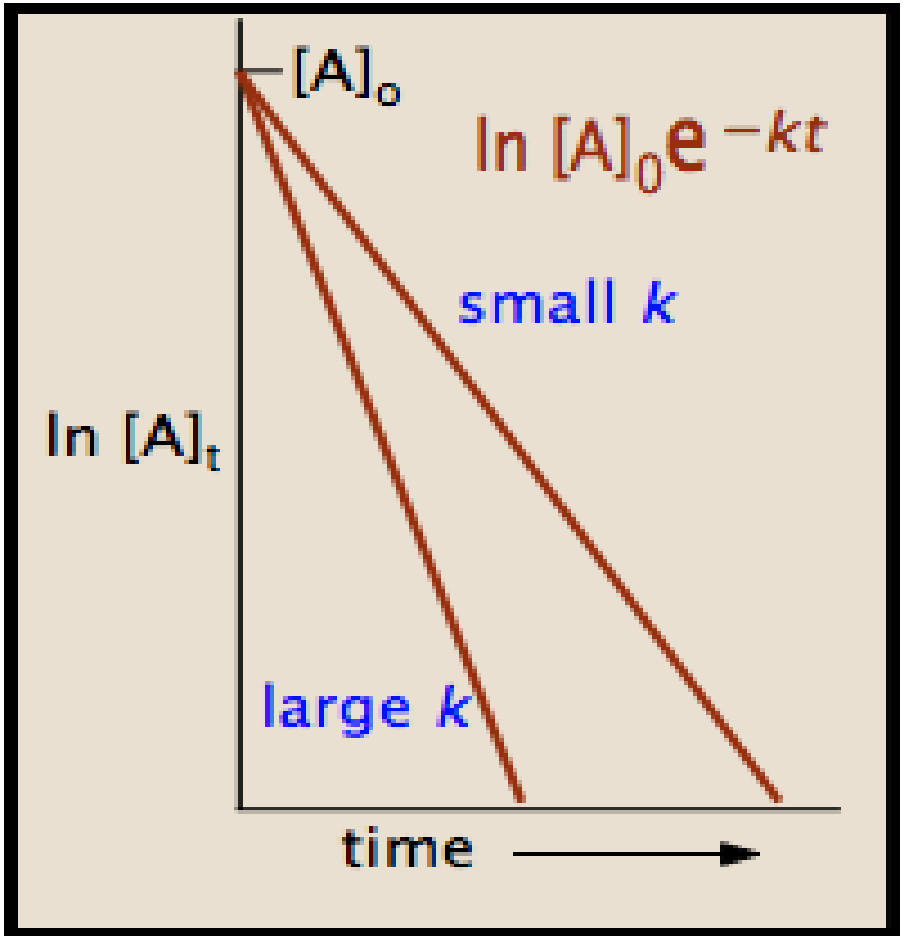
$$2NO(g) + 2H_2(g) \rightarrow N_2(g) + 2H_2O(g)$$

From the following data, determine the rate law and rate constant.

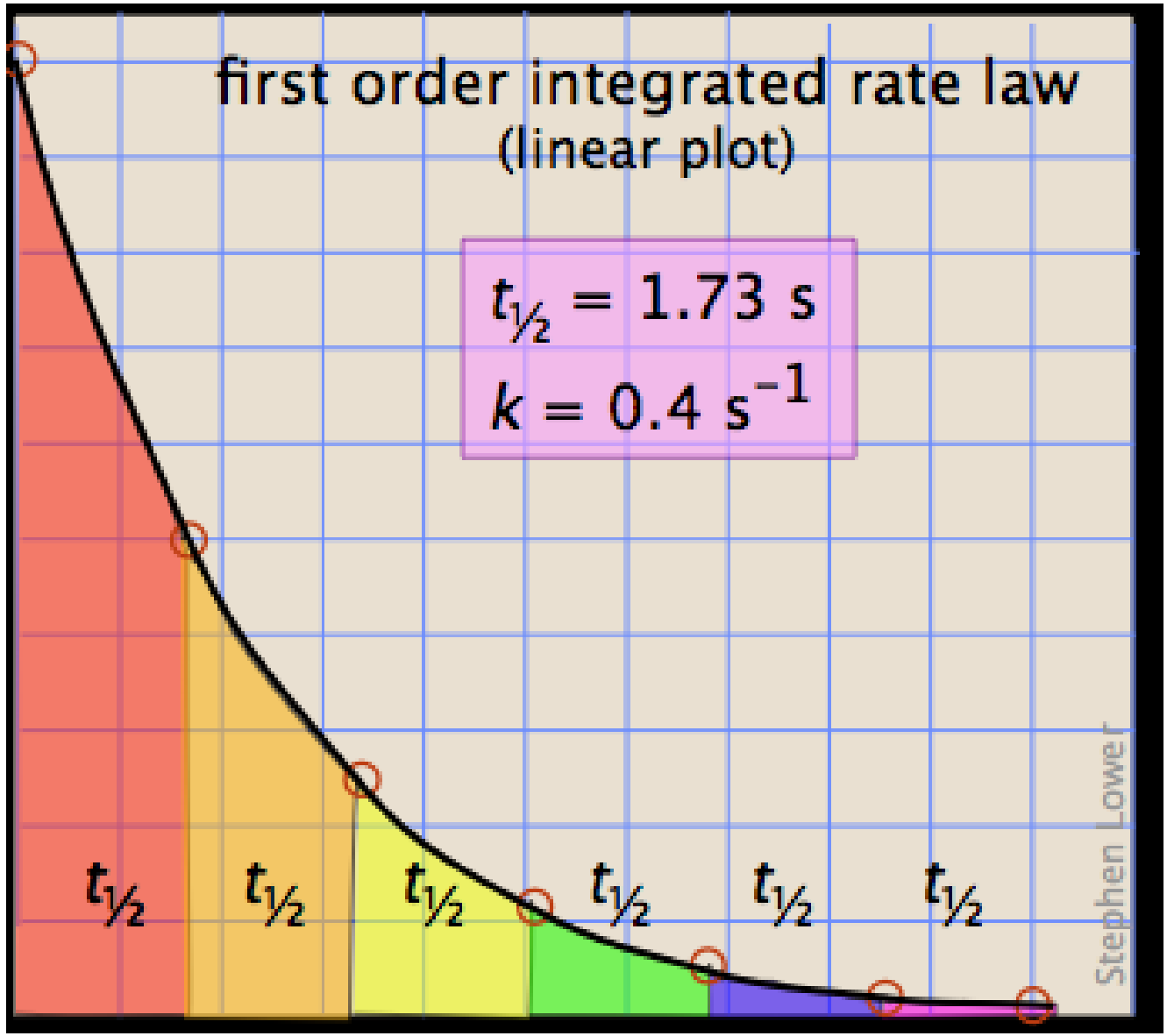
Run	$[NO]_o$ (M)	$[H_2]_o$ (M)	Initial Rate (M/min)
1	0.0100	0.0100	0.00600
2	0.0200	0.0300	0.144
3	0.0100	0.0200	0.0120

First Order Integrated Law





First Order Integrated Law



[A]

Time, sec

If 3.0 g of substance A decomposes for 36 minutes the mass of unreacted A remaining is found to be 0.375 g. What is the half life of this reaction if it follows *first-order* kinetics?