



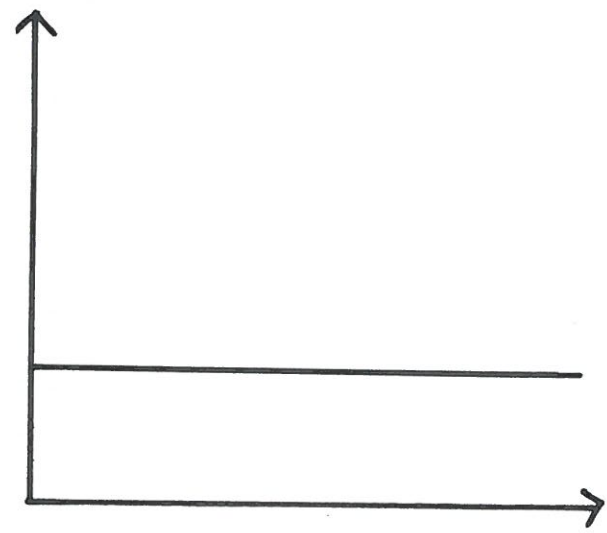
Orders of Reaction

- 1
- 2
- 3
- 4
- 5



Overall Order

e.g.





FINDING ORDERS OF REACTION - USING DATA



EXPERIMENT	INITIAL [A] (mol.dm ⁻³)	INITIAL [B] (mol.dm ⁻³)	INITIAL RATE (mol.dm ⁻³ .s ⁻¹)
1	0.5	0.5	0.002
2	1.0	0.5	0.008
3	1.0	1.0	0.008
4	1.5	1.5	0.018

METHOD!



- Finding A

- Finding B



FINDING ORDERS OF REACTION - USING DATA



EXPERIMENT	INITIAL [A] (mol.dm ⁻³)	INITIAL [B] (mol.dm ⁻³)	INITIAL [C] (mol.dm ⁻³)	INITIAL RATE (mol.dm ⁻³ .S ⁻¹)
1	0.2	0.1	0.4	0.8 X 10 ⁻³
2	0.2	0.4	0.4	3.2 X 10 ⁻³
3	0.1	0.8	0.4	1.6 X 10 ⁻³
4	0.1	0.3	0.2	0.6 X 10 ⁻³

Finding B

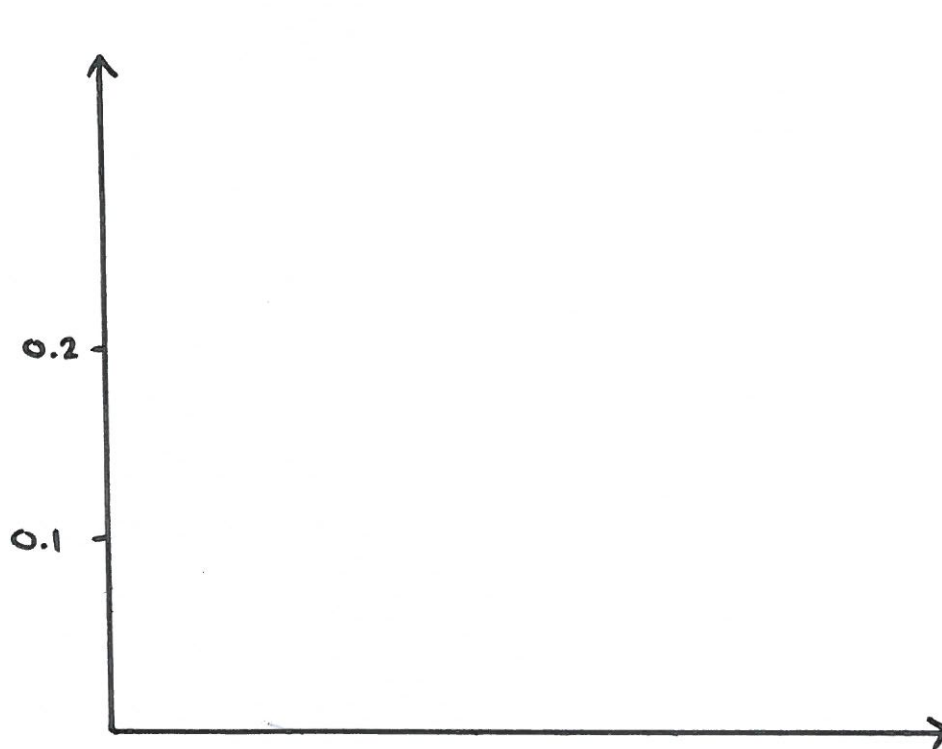
Finding A

Finding C



Concentration Vs. Time Graphs

1 2 3 4 5



Calculating Rate

Proving Orders of Reaction

-

ie.

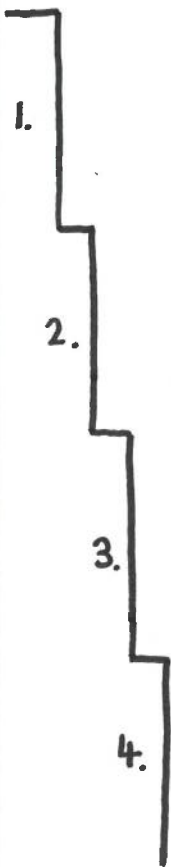
[]	Rate



USING THE RATE EXPRESSION - FINDING K

EXPERIMENT	[CH ₃ COCH ₃] (mol.dm ⁻³)	[I ₂] (mol.dm ⁻³)	INITIAL RATE (mol.dm ⁻³ .s ⁻¹)
1	0.5	0.1	6.8x10 ⁻⁵
2	1.0	0.1	1.36x10 ⁻⁴
3	1.0	0.2	1.36x10 ⁻⁴

Use the rate data to determine the rate expression for the reaction and hence the value for the rate constant.





Rate Equation & Rate-Determining Step

e.g. 1.

Step 1 =

Step 2 =

e.g. 2.

Step 1 =

Step 2 =

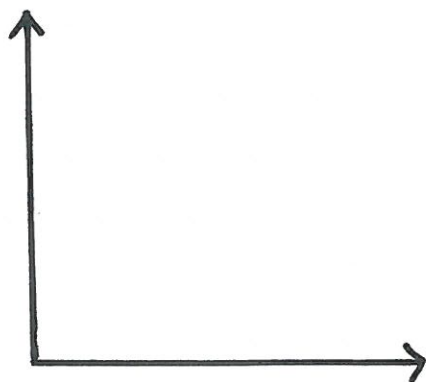
e.g. 3.

Step 1 =

Step 2 =



The Arrhenius Equation ★



||
||
||
||
||
||

The $-\frac{E_a}{RT}$ Bit...

A



The Arrhenius Equation - The Graph!

1 2 3 4 5



BEWARE!

- ① Double check values/units on the axes when calculating gradient!
- ② You may need to convert units of E_a to $\text{kJ}\cdot\text{mol}^{-1}$ i.e. $\div 1000$!!