

Rate Law Summary

Reaction Order	Differential Rate Equation	Integrated Rate Equation	Linear Plot	Slope of Linear Plot	Units of Rate Constant	Half Life Equation
Zero	Rate = k	$[A]=[A]_0-kt$	$[A]$ vs t	-k	M/t or $\text{mol L}^{-1} \text{t}^{-1}$	$t_{1/2}=[A]_0/2k$
First	Rate = $k[A]$	$\ln[A]=\ln[A]_0-kt$ or $[A]=[A]_0e^{(-kt)}$	$\ln[A]$ vs t	-k	$1/t$ or t^{-1}	$t_{1/2}=0.693/k$
Second	Rate = $k[A]^2$	$1/[A] = 1/[A]_0+kt$	$1/A$ vs t	k	$1/Mt$ or $\text{L mol}^{-1} \text{t}^{-1}$	$t_{1/2}=1/[A]_0k$

M is molarity, mol/L

Using discrete values, Rate = $\Delta[A]/\Delta t$

Using infinitesimal values, Rate = $d[A]/dt$

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