

# CH 222 Quick & Dirty Kinetics Cheat Sheet

For the general reaction:  $aA \rightarrow \text{Products}$

|  | <b>Zero Order</b>    | <b>First Order</b>          | <b>Second Order</b>          |
|--|----------------------|-----------------------------|------------------------------|
| <b>Rate Law</b>  | Rate = $k$           | Rate = $k[A]$               | Rate = $k[A]^2$              |
| <b>Integrated Rate Law</b>   | $[A] = -kt + [A]_0$  | $\ln [A] = -kt + \ln [A]_0$ | $[A]^{-1} = kt + [A]_0^{-1}$ |
| <b>Plot Needed For Straight Line</b>                               | $[A]$ versus $t$     | $\ln [A]$ versus $t$        | $[A]^{-1}$ versus $t$        |
| <b>Relationship of Rate Constant to the Slope of Straight Line</b> | Slope = $-k$         | Slope = $-k$                | Slope = $k$                  |
| <b>Half-life</b>   | $t_{1/2} = [A]_0/2k$ | $t_{1/2} = 0.693/k$         | $t_{1/2} = 1/(k[A]_0)$       |