

Kinetics

First-order: $\ln \frac{[A]_0}{[A]_t} = akt$

$$t_{1/2} = \frac{\ln 2}{ak}$$

Second-order: $\frac{1}{[A]_t} - \frac{1}{[A]_0} = akt$

$$t_{1/2} = \frac{1}{ak [A]_0}$$

Arrhenius: $k = Ae^{-E_a/RT}$

Quadratic equation

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

Henderson-Hasselbalch

$$\text{pH} = \text{p}K_a + \log \frac{\text{base}}{\text{acid}}$$

Electrochemistry

$$\Delta G^\circ = -nFE^\circ$$

$$E = E^\circ - \frac{0.0257 \text{ V}}{n} \ln Q$$

Nuclear

$$A = \lambda N$$

$$t_{1/2} = \frac{\ln 2}{\lambda}$$

$$\ln \frac{N_0}{N_t} = \ln \frac{A_0}{A_t} = \lambda t$$

$$E = mc^2$$