Formeln für die Lösung von Rechenaufgaben

First-order Reactions:

$$A \xrightarrow{k} B$$

$$t_{1/2} = \frac{\ln 2}{k}\ ; \qquad v_i = k \cdot [A_0]$$

Second-Order Reactions:

$$A + B \xrightarrow{k} C;$$

$$t_{1/2} = \frac{1}{k[A_0]} \text{ (if } [A_0]=[B_0]\text{)}\ ; \qquad v_i = k \cdot [A_0] \cdot [B_0]$$

Equilibrium between two states:

$$A \leftrightarrow B : \quad \Delta G^0 = -RT \ln ([B]/[A])$$

Temperature dependence of rate constants (Arrhenius equation):

$$k = A \cdot e^{-E_A/RT}$$

Dependence of acceleration factor on difference in E_A:

$$\frac{k_{cat}}{k_{uncat}} = e^{\frac{\Delta E_A}{R \cdot T}}$$

Michaelis Menten equation:

$$E + S \underset{k_{-1}}{\overset{k_1}{\rightleftharpoons}} ES \xrightarrow{k_{cat}} E + P$$

$$v_i = v_{max} \frac{[S]}{K_M + [S]}, \text{ where } v_{max} = k_{cat} \cdot [E_0]; \quad K_M = \frac{k_{-1} + k_{cat}}{k_1}$$

Protein-ligand binding equilibria

$$P + L \underset{k_{off}}{\overset{k_{on}}{\rightleftharpoons}} PL$$

$$K_{Diss} = \frac{k_{off}}{k_{on}} = \frac{P \cdot L}{PL} \qquad (L = L_{tot} \text{ if } P_0 << L_0)$$