$$A = (-k_0 \times t) + A_0 \qquad \frac{dA}{dt} = -k_0 \qquad k = -\frac{(\ln C_2 - \ln C_1)}{t_2 - t_1} = -slope \qquad t_{1/2} = \frac{0.693}{k}$$

$$Cp_0 = \frac{Dose}{V_c} \qquad Cp = Cp_0 \times e^{-k \times t} \qquad V_c = \frac{CL}{k} \qquad AUC_{t_1 - t_2} = \frac{(C_2 + C_1) \times (t_2 - t_1)}{2}$$

$$AUC_{0-\infty} = \sum AUC_{t_1 - t_2} + \frac{Cp_{t_{last}}}{k} \qquad AUC_{0-\infty} = \frac{F \times Dose}{CL} \qquad F = \frac{Dose_{iv} \times AUC_{po}}{Dose_{po} \times AUC_{iv}}$$

$$Cp = A \cdot e^{-\alpha \cdot t} + B \cdot e^{-\beta \cdot t} \qquad AUC_{0-\infty} = \frac{A}{\alpha} + \frac{B}{\beta} \qquad V_\beta = \frac{Dose \times F}{\beta \times AUC} = \frac{CL}{\beta}$$

$$CL = k \times Vc = \beta \times V_\beta = \frac{Dose}{AUC_{0-\infty}} \qquad Cp = \frac{Dose \cdot F \cdot ka}{Vd \cdot (ka - k)} \cdot \left(e^{-k \cdot t} - e^{-ka \cdot t}\right) \qquad tmax = \frac{1}{ka - k} \times \ln\frac{ka}{k}$$

$$Css_{avg} = \frac{Dose \times F}{Vd \times k \times \tau} = \frac{Dose \times F}{CL \times \tau} = \frac{k_0}{CL} \qquad Cp = \frac{Dose \cdot F \cdot ka}{Vd \cdot (k_{res} - k_{term})} \qquad AUC_{0-\infty} = Cp_{extrapol} \times \left(\frac{1}{k_{term}} - \frac{1}{k_{res}}\right)$$

$$Cp = \frac{k_0}{Vd \cdot k} \cdot (1 - e^{-k \cdot t}) \qquad Cp = \frac{k_0}{Vd \cdot k} \cdot (1 - e^{-k \cdot t}) \cdot e^{-k \cdot (T - t)} \qquad Css = \frac{k_0}{CL}$$

$$LD = MD \times R \qquad LD = \frac{k_0}{k} = Css_{desired} \times Vc$$

$$Cp = \frac{Dose}{Vd} \cdot \left(\frac{1 - e^{-n \cdot k \cdot \tau}}{1 - e^{-k \cdot \tau}}\right) \cdot e^{-k \cdot t} \qquad Cmax_{ss} = \frac{Dose}{Vd} \cdot \left(\frac{1}{1 - e^{-k \cdot \tau}}\right) \qquad Cmin_{ss} = \frac{Dose}{Vd} \cdot \left(\frac{1}{1 - e^{-k \cdot \tau}}\right) \cdot e^{-k \cdot \tau}$$

$$Css_{avg} = \frac{AUC_{ss_{0-\tau}}}{\tau} \qquad (Cp)n = \frac{A \times (1 - e^{-n \times \alpha \times \tau}) \times e^{-\alpha \times t}}{1 - e^{-\alpha \times \tau}} + \frac{B \times (1 - e^{-n \times \beta \times \tau}) \times e^{-\beta \times t}}{1 - e^{-\beta \times \tau}}$$

$$R = \frac{(Css)min}{(C_1)min} = \frac{(Css)max}{(C_1)max} = \frac{(AUC_{0-\tau})_{ss}}{(AUC_{0-\tau})_{n=1}} = \frac{1}{1 - e^{-k \cdot \tau}} \qquad Cp_n = \frac{Dose \cdot F \cdot ka}{Vd \cdot (ka - k)} \cdot \left(\frac{1 - e^{-n \cdot k \cdot \tau}}{1 - e^{-k \cdot \tau}} \cdot e^{-k \cdot t} - \frac{1 - e^{-n \cdot ka \cdot \tau}}{1 - e^{-ka \cdot \tau}} \cdot e^{-ka \cdot t}\right)$$

$$\sum Xu_{0-t} = \frac{k_r \times Dose \times F}{k} \cdot \left(1 - e^{-k \times t}\right) \qquad ARE = \sum Xu_{0-\infty} - \sum Xu_{0-t} = \sum Xu_{0-\infty} \times e^{-k \times t}$$

$$\frac{dXu}{dt} = kr \times Dp_0 \times e^{-k \times t} \qquad CL_r = k_r \times Vd = \frac{\sum Xu}{AUC_{0-\infty} of\ Drug}$$

$$Vd = Vd_u \times fu = Vp + Vt \cdot \frac{Ct}{Cp} = Vp + Vt \cdot \frac{fu_p}{fu_t}$$

$$CL_{gf} = GFR \cdot fu \qquad CL(mL / min) = \frac{(140 - \text{age in y}) \cdot ideal\ body\ wt\ in\ kg}{72 \cdot \text{Cr in mg/dl}}$$

$IBW_{\Gamma}(kg) = 50 + (2.3 \times \text{inches ht.} > 5ft)$

$IBW_E(kg) = 45.5 + (2.3 \times \text{inches ht.} > 5ft)$

$$U/P = \frac{1 + 10^{pH_{urine} - pKa}}{1 + 10^{pH_{plasma} - pKa}} \qquad U/P = \frac{1 + 10^{pKa - pH_{urine}}}{1 + 10^{pKa - pH_{plasma}}}$$

$$CL_r = \left[(f_{u,p} \times GFR) + CL_{secretion}\right] \times \left[1 - F_{reabs}\right]$$

$$CL_H = Q \times \frac{fu \times CL'_{int}}{Q + fu \times CL'_{int}} \qquad E = \frac{Cin - Cout}{Cin} = \frac{fu \times CL'_{int}}{Q + fu \times CL'_{int}}$$

$$F = f_g \times f_h = f_g \times (1 - E) \qquad F = \frac{Q}{Q + fu \times CL'_{int}} \qquad Dose \approx daily\ elimination\ rate = \frac{V\,max \times Cpss}{km + Cpss}$$

$$\frac{1}{Dose} = \left(\frac{km}{Vmax} \times \frac{1}{Css}\right) + \frac{1}{V\,max} \qquad t_{90\%} = \frac{km \times Vd}{(V_{max} - R_{in})^2} \times \left(2.3 \times V_{max} - 0.9 \times R_{in}\right)$$

$$Effect = \frac{E_{max} \cdot C^n}{EC_{50} + C^n}$$