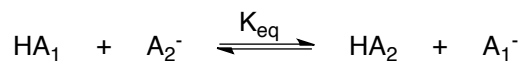


$$K_{A1} = \frac{[\text{H}^+][\text{A}_1^-]}{[\text{HA}_1]} = 10^{-\text{p}K_{A1}}$$

$$K_{A2} = \frac{[\text{H}^+][\text{A}_2^-]}{[\text{HA}_2]} = 10^{-\text{p}K_{A2}}$$



$$\begin{aligned} K_{\text{eq}} &= \frac{[\text{HA}_2][\text{A}_1^-]}{[\text{HA}_1][\text{A}_2^-]} = \frac{[\text{HA}_2][\text{A}_1^-]}{[\text{HA}_1][\text{A}_2^-]} \times \frac{[\text{H}^+]}{[\text{H}^+]} \\ &= \frac{[\text{H}^+][\text{A}_1^-]}{[\text{HA}_1]} \times \frac{[\text{HA}_2]}{[\text{H}^+][\text{A}_2^-]} = \frac{K_{A1}}{K_{A2}} = \frac{10^{-\text{p}K_{A1}}}{10^{-\text{p}K_{A2}}} \\ &= 10^{(\text{p}K_{A2} - \text{p}K_{A1})} \end{aligned}$$