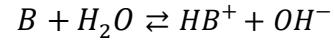


Svag enprotonig bas + stark syra

$$K_w = [OH^-][H_3O^+] \Leftrightarrow [OH^-] = \frac{K_w}{[H_3O^+]}$$

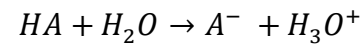


$$K_b = \frac{[HB^+][OH^-]}{[B]_2} \Leftrightarrow [HB^+] = \frac{K_b[B]_2}{[OH^-]} = \frac{K_b[B]_2}{\frac{K_w}{[H_3O^+]}} = \frac{K_b[B]_2[H_3O^+]}{K_w}$$

$$[B]_1 = [B]_2 + [HB^+] = [B]_2 + \frac{K_b[B]_2}{[OH^-]} = [B]_2 \left(1 + \frac{K_b}{[OH^-]} \right) = [B]_2 \left(\frac{[OH^-] + K_b}{[OH^-]} \right) \Leftrightarrow$$

$$[B]_2 = \frac{[B]_1}{\left(\frac{[OH^-] + K_b}{[OH^-]} \right)} = \frac{[B]_1[OH^-]}{[OH^-] + K_b}$$

$$[B]_2 = \frac{[B]_1 \frac{K_w}{[H_3O^+]}}{\frac{K_w}{[H_3O^+]} + K_b} = \frac{\frac{[B]_1 K_w}{[H_3O^+]}}{\frac{K_w + K_b[H_3O^+]}{[H_3O^+]}} = \frac{[B]_1 K_w}{K_w + K_b[H_3O^+]}$$



$$[HA]_1 = [A^-]$$

$$[HB^+] + [H_3O^+] = [OH^-] + [A^-]$$

$$\frac{K_b[B]_2[H_3O^+]}{K_w} + [H_3O^+] = \frac{K_w}{[H_3O^+]} + [HA]_1$$

$$\frac{K_b [H_3O^+] \frac{[B]_1 K_w}{K_w + K_b [H_3O^+]}}{K_w} + [H_3O^+] = \frac{K_w}{[H_3O^+]} + [HA]_1$$

$$\frac{K_b [H_3O^+] [B]_1}{K_w + K_b [H_3O^+]} + [H_3O^+] = \frac{K_w}{[H_3O^+]} + [HA]_1$$

$$\frac{K_b [H_3O^+]^2 [B]_1}{K_w + K_b [H_3O^+]} + [H_3O^+]^2 = K_w + [HA]_1 [H_3O^+]$$

$$K_b [H_3O^+]^2 [B]_1 + K_w [H_3O^+]^2 + K_b [H_3O^+]^3 = K_w^2 + K_w K_b [H_3O^+] + K_w [HA]_1 [H_3O^+] + K_b [HA]_1 [H_3O^+]^2$$

$$K_b [H_3O^+]^2 [B]_1 + K_w [H_3O^+]^2 + K_b [H_3O^+]^3 - K_w^2 - K_w K_b [H_3O^+] - K_w [HA]_1 [H_3O^+] - K_b [HA]_1 [H_3O^+]^2 = 0$$

$$K_b [H_3O^+]^3 + [H_3O^+]^2 (K_b [B]_1 + K_w - K_b [HA]_1) - [H_3O^+] (K_b K_w + K_w [HA]_1) - K_w^2 = 0$$

$$K_b [H_3O^+]^3 + [H_3O^+]^2 (K_b ([B]_1 - [HA]_1) + K_w) - [H_3O^+] (K_w (K_b + [HA]_1) - K_w^2) = 0$$