Titration Curve
weak base with strong acid

The **START** of the titration is the same as a regular (type 1) weak base problem. You know \( K_b \) and \([B]\) so you can calculate pH.

\[
B + H_2O \rightleftharpoons BH^+ + OH^-
\]

The **equivalence point** (endpoint) is the same as a regular (type 1) salt of a weak base problem (BH\(_X\)). You know \([BH^+]\) and you can calculate pH. Also note that the pH must be **less than** 7 due to the ionization of BH\(^+\).

\[
BH^+ \rightleftharpoons B + H^+
\]

This region is calculated simply by determining the amount of H\(^+\) in EXCESS that has been added. No equilibrium calculations necessary.

The **buffer zone**
a “type 2” calculation
conjugate ratios are known, use Henderson-Hasselbach to calculate pH. pH’s are generally above 7 here.

The **overshoot**
This region is calculated simply by determining the amount of H\(^+\) in EXCESS that has been added. No equilibrium calculations necessary.

### The half-way point is important!

After you have determined the equivalence point (endpoint) of the titration, go to half that value. The pH at the half-titration point is equal to the \( pK_a \) of the weak acid, BH\(^+\). To get the \( pK_b \) of the base (B) you MUST subtract the \( pK_a \) from 14. The reason for this is that the pOH is actually what equals the \( pK_b \).

\[
pK_b = 14 - pK_a
\]