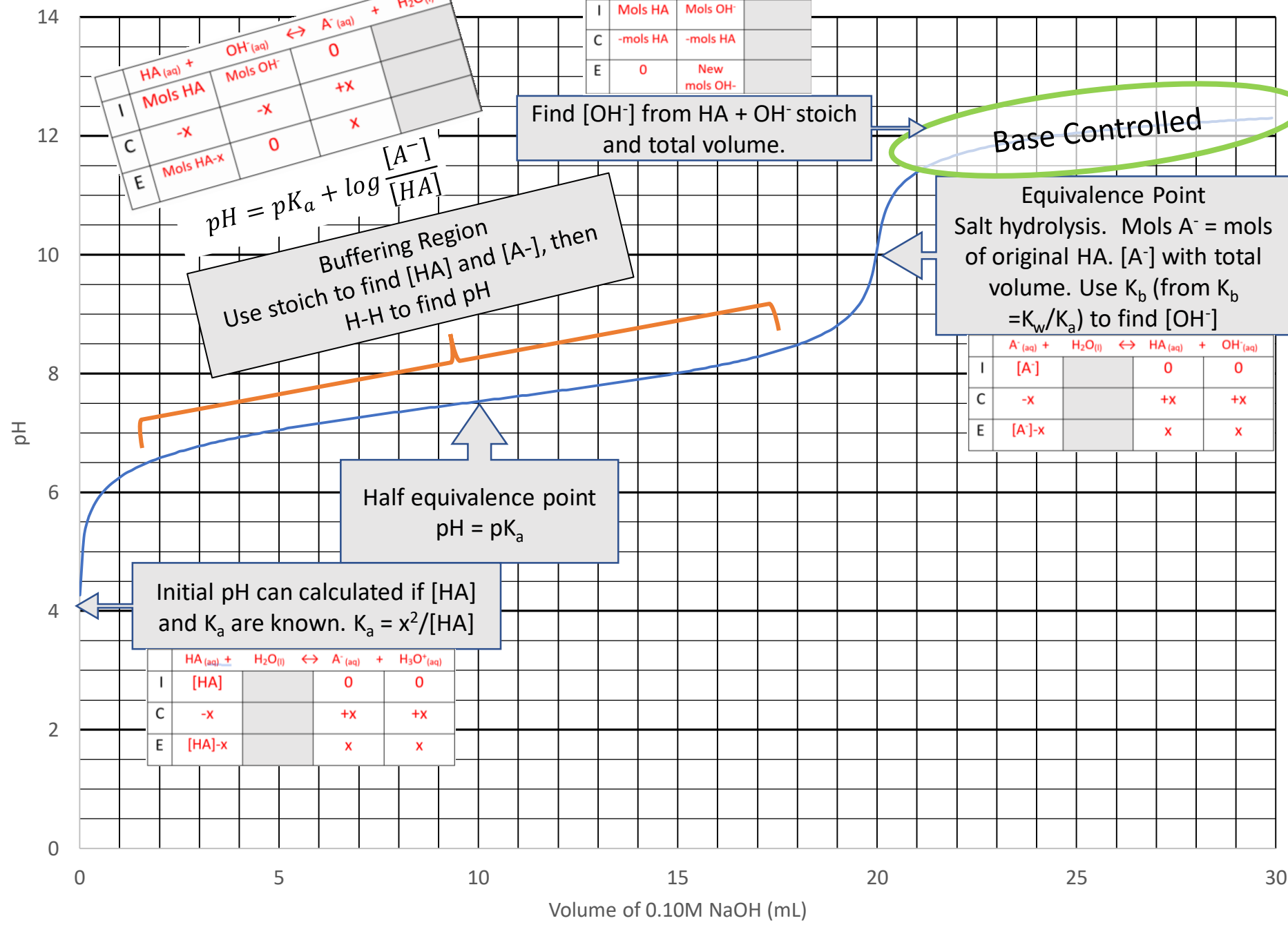


20.0mL of Unknown Monoprotic Acid Solution



	HA (aq) + OH ⁻ (aq)	↔	A ⁻ (aq) + H ₂ O(l)
I	Mols HA		0
C	-x		+x
E	Mols HA-x		x

$$pH = pK_a + \log \frac{[A^-]}{[HA]}$$

Buffering Region
Use stoich to find [HA] and [A⁻], then H-H to find pH

	H ⁺ (aq) + OH ⁻	↔	H ₂ O(aq)
I	Mols HA		
C	-mols HA		-mols HA
E	0		New mols OH ⁻

Find [OH⁻] from HA + OH⁻ stoich and total volume.

Base Controlled

Equivalence Point
Salt hydrolysis. Mols A⁻ = mols of original HA. [A⁻] with total volume. Use K_b (from K_b = K_w/K_a) to find [OH⁻]

	A ⁻ (aq) + H ₂ O(l)	↔	HA (aq) + OH ⁻ (aq)
I	[A ⁻]		0
C	-x		+x
E	[A ⁻]-x		x

Half equivalence point
pH = pK_a

Initial pH can be calculated if [HA] and K_a are known. K_a = x²/[HA]

	HA (aq) + H ₂ O(l)	↔	A ⁻ (aq) + H ₃ O ⁺ (aq)
I	[HA]		0
C	-x		+x
E	[HA]-x		x

Volume of 0.10M NaOH (mL)

20.0mL of Unknown Ammonia Solution

	$B_{(aq)} + H_2O_{(l)} \leftrightarrow BH^+_{(aq)} + OH^-_{(aq)}$
I	[B] 0 0
C	-x +x +x
E	[B]-x x x

Initial pH can be calculated if [B] and K_b are known. $K_b = x^2/[B]$.

Half equivalence point
 $pOH = pK_b$

Buffering Region
Use stoich to find [B] and [BH⁺], then H-H to find pH

	$B_{(aq)} + H_3O^+_{(l)} \leftrightarrow BH^+_{(aq)} + H_2O_{(l)}$
I	Mols B Mols H ₃ O ⁺ 0 0
C	-x -x +x +x
E	Mols B-x 0 +x x

	$BH^+_{(aq)} + H_2O_{(l)} \leftrightarrow B_{(aq)} + H_3O^+_{(aq)}$
I	[BH ⁺] 0 0
C	-x +x +x
E	[BH ⁺]-x x x

Equivalence Point
Salt hydrolysis. Mols BH⁺ = mols of original B. [BH⁺] with total volume. Use K_a (from $K_a = K_w/K_b$) to find [H₃O⁺]

Or, find K_a and use acid H-H where $HA = BH^+$ and $A^- = B$

$pOH = pK_b + \log \frac{[BH^+]}{[B]}$

Find [H₃O⁺] from H⁺ + B stoich and total volume.

	$H^+_{(aq)} + OH^- \leftrightarrow H_2O_{(aq)}$
I	Mols H ⁺ Mols B
C	-mols B -mols B
E	New mols H ⁺ 0

Acid Controlled

