

(11.21) Buffer 0.12M Hlac 0.11M NaLac ^{comps:}

WA
Salt of WA

STOPS any drastic changes in pH

Start with a Base

Start adding Acid to my soln

NaLac
Na⁺OH⁻ SB
HLac⁻ WA
Basic Salt.

$$pH = pK_a + \log \frac{b}{a}$$

$$pH = -\log(1.4 \times 10^{-4}) + \log \frac{0.11}{0.12} = 3.816 \text{ pH}$$

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(b) 85ml 0.13M Hlac + 95ml 0.15M NaLac
 180ml total = 0.180L

Need to Recalc new M bc once mixed volume increase changing M.

Convert to moles:

$\frac{1.1 \times 10^{-2} \text{ mole Hlac}}{0.18 \text{ L}} = 6.11 \times 10^{-2} \text{ M Hlac}$

$\frac{1.42 \times 10^{-2} \text{ mole NaLac}}{0.18 \text{ L}} = 7.89 \times 10^{-2} \text{ M NaLac}$

Recalc M divide by new total ml

$$pH = -\log(1.4 \times 10^{-4}) + \log \frac{7.89 \times 10^{-2}}{6.11 \times 10^{-2}} = 3.96$$

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Neutralization (moles acid = moles base)
 H^+ OH^-

USE MOLES!

RICE table for moles (Neutralization)

Moles Acid = Moles Base

$n_A * M_A * V_A = n_B * M_B * V_B$

How many H^+ ← ← how many OH^-

Mar 1-8:09 AM

50 ml 3M HCl + Ca(OH)₂ 2M
? ml

HS
Chem

moles A = moles B
 n M l. = n M l

(1)(3)(50ml) = (2)(2)(ml)

37.5 ml

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Now Graduate to College Chem (Base) 12 soln

Buffer = 0.3 mole HOAc + 0.3 mole NaOAc Salt of WA
 WA pH Buffer = 4.74

① Add 0.02 mole NaOH to my buffer. pH = ?

① Next Mdes

HOAc	+	NaOH^-	\rightleftharpoons	NaOAc^-	+	H_2O
I 0.3 mole		0.02 mole		0.3 mole		
Δ -0.02		-0.02		+0.02 mole		
E 0.28 mole		0		0.32 mole		

② Recalc new M
1 l 1 l
0.28 M HOAc 0.32 M OAc^-

MOLES
 Subst. #
 Smallest #
 Acid or Base
 Reactants

② Calc pH. either RICE or H-H

$$\text{pH} = \text{p}K_a + \log \frac{b}{a}$$

$$\text{pH} = -\log(1.8 \times 10^{-5}) + \log \frac{0.32}{0.28}$$

pH = 4.8

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OR RICE

③ new pH

HOAc	\rightarrow	H^+	+	OAc^-
I 0.28		0		0.32
Δ -x		+x		+x
E 0.28-x		x		0.32+x

$$K_a = \frac{[\text{H}^+][\text{OAc}^-]}{[\text{HOAc}]} = \frac{1.8 \times 10^{-5}}{1} = \frac{x(0.32+x)}{(0.28-x)}$$

$$x = 1.575 \times 10^{-5} = [\text{H}^+]$$

$$\text{pH} = -\log([\text{H}^+]) = 4.8$$

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(b) 0.3 mole H_2Ac + 0.3 mole NaOAc ($\text{pH} = 4.74$)
 $K_a = 1.8 \times 10^{-5}$

Add 0.02 mole HCl \rightarrow Find new pH.

$\text{HCl} + \text{NaOAc} \rightleftharpoons \text{H}_2\text{Ac} + \text{NaCl}$

① Next
 ICE
 mole

	H^+	$+$	OAc^-	\rightleftharpoons	H_2Ac
I	0.02		0.3		0.3
Δ	-0.02		-0.02		+0.02
E			0.28 mole		0.32 mole
			1L		1L

② pH
 ICE @ HH

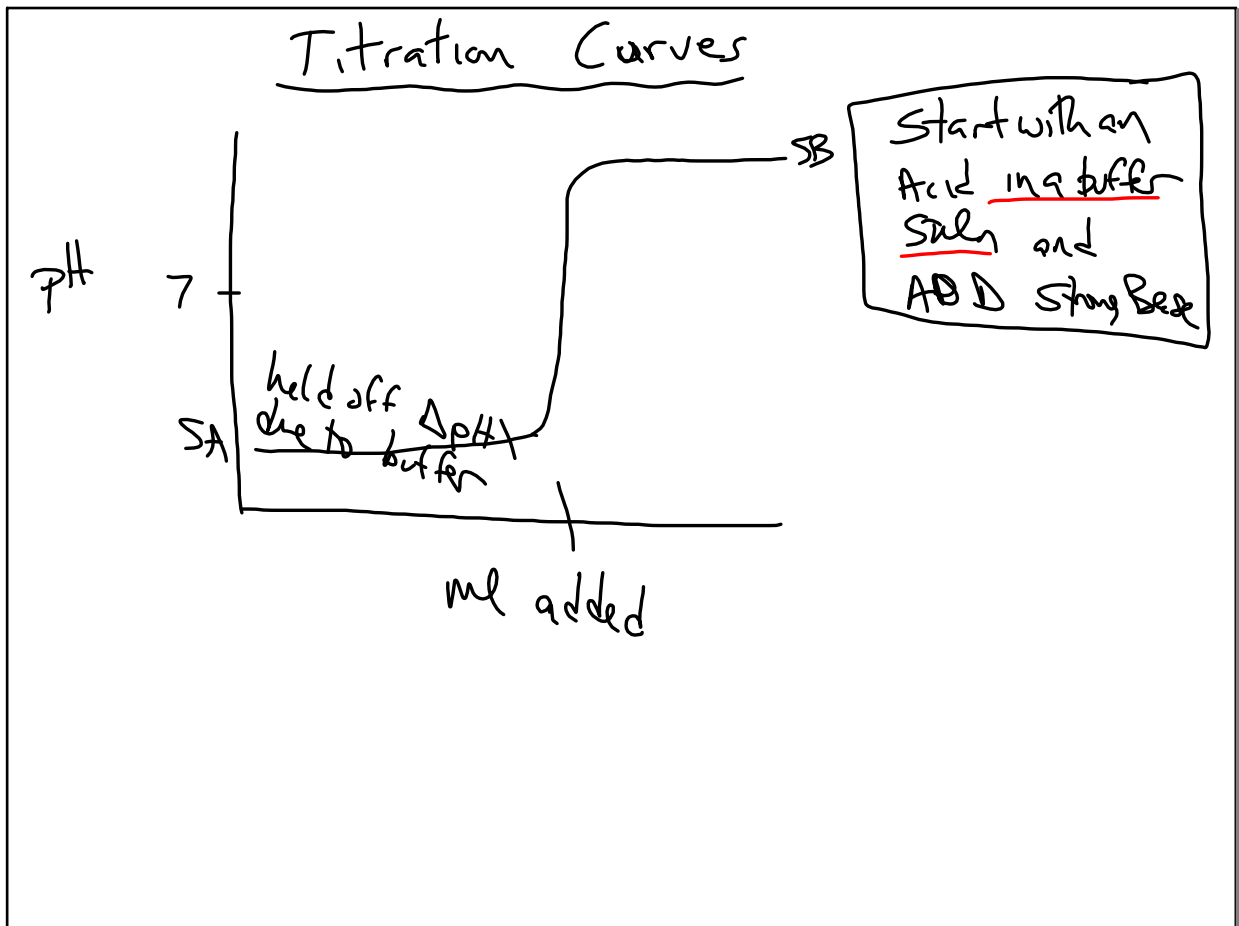
0.28M OAc^- 0.32M H_2Ac

$\text{pH} = \text{p}K_a + \log \frac{b}{a}$

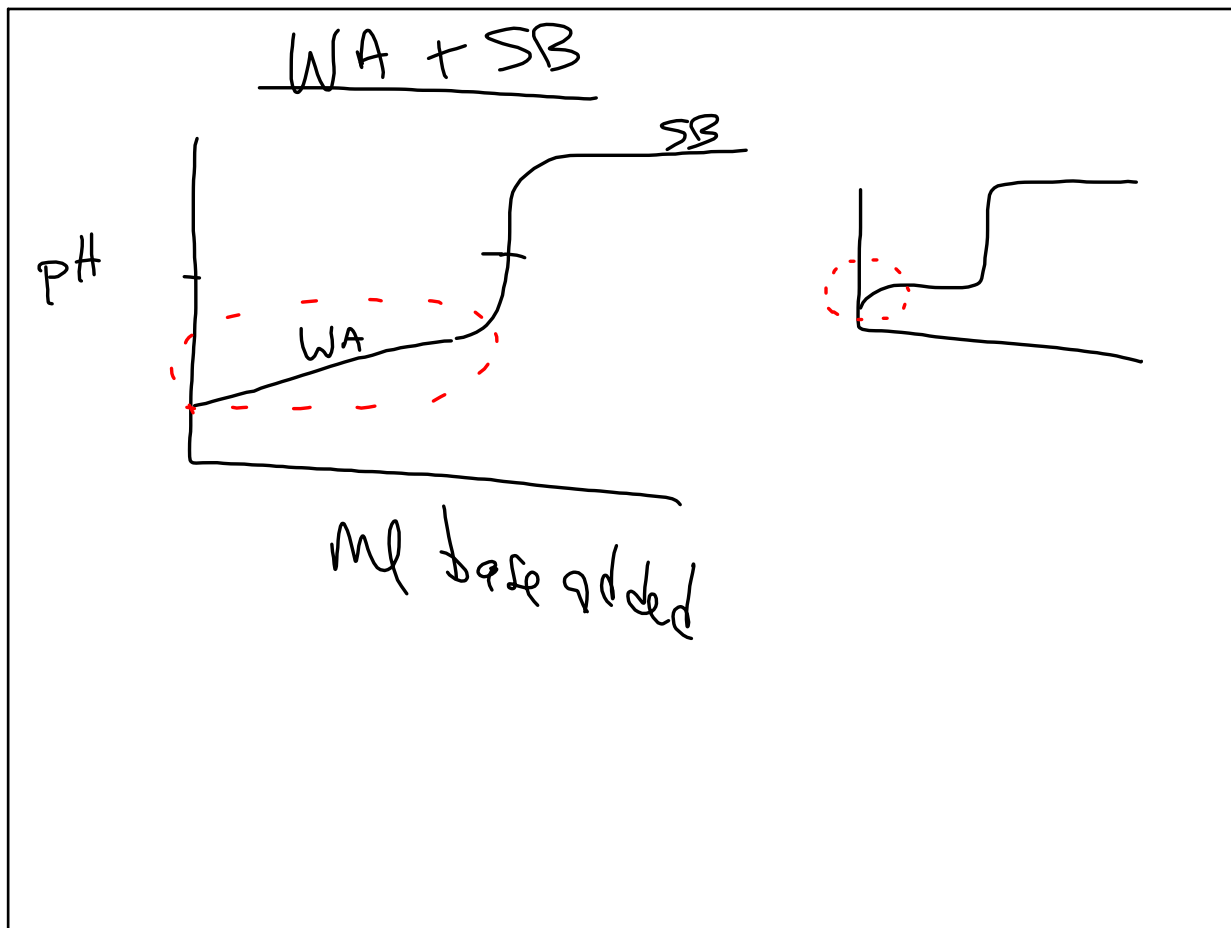
$\text{pH} = -\log(1.8 \times 10^{-5}) + \log \frac{0.28}{0.32}$

$\text{pH} = 4.69$

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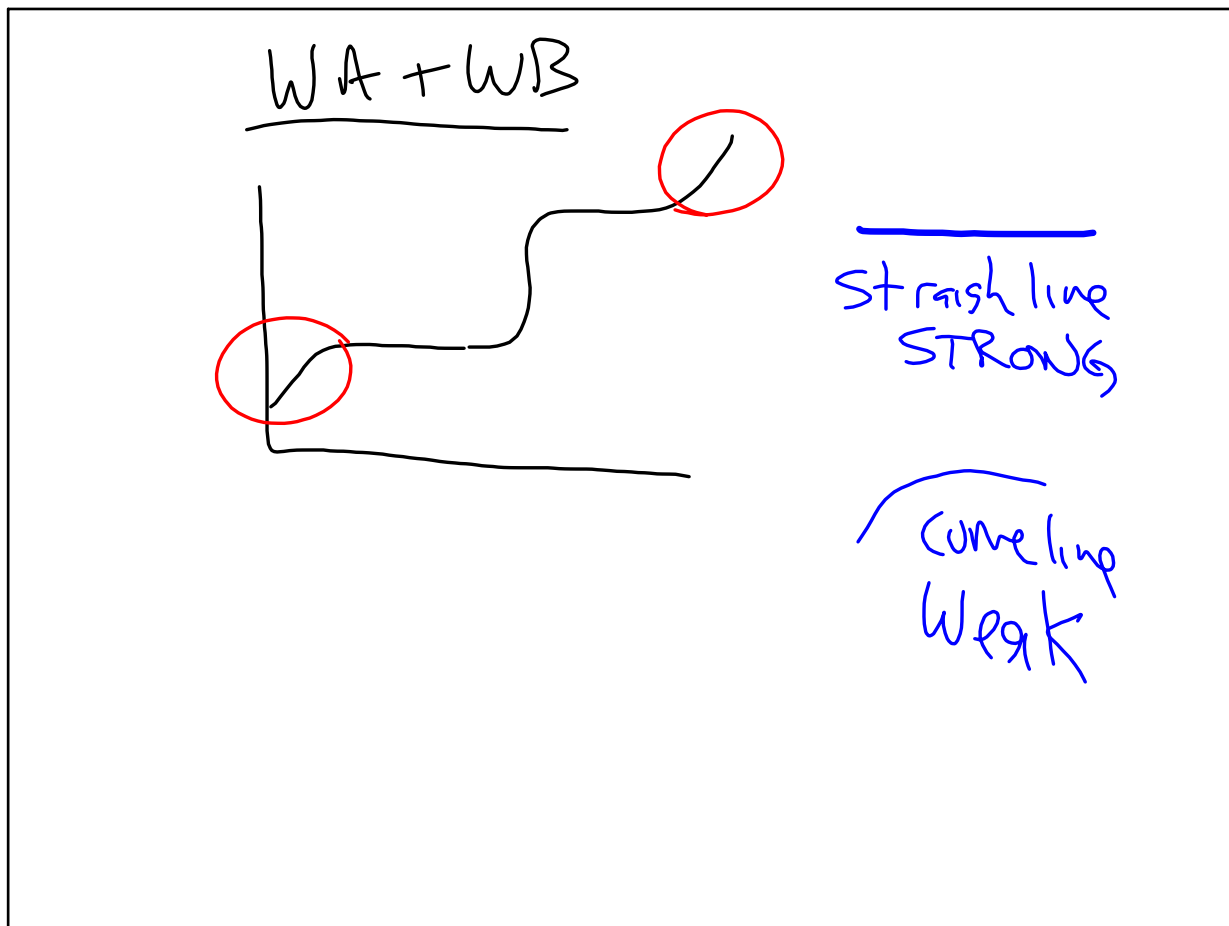
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Mar 1-9:12 AM



Mar 1-9:13 AM



Mar 1-9:14 AM

17 / 27 + 30

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