$1*10^0 = 1$

1M HoAc / $K_a = 1.8*10^{-5}$

IGNORE "-x" (8) Keep "-x"

$HoAc \rightarrow H^+ + oAc^-$

	HoAc	H^+	oAc^-
I	1	~~0~~	~~0~~
Δ	−x	+x	+x
E	1−x	~~x~~	x

$K_a = \frac{(x)(x)}{1-x} = 1.8*10^{-5}$ (-5)

$X = 4.24264068*10^{-3}$

$pH = 2.37236874745$

$\frac{(x)(x)}{1-x} = \frac{1.8*10^{-5}}{1}$

$X^2 = -1.8*10^{-5}x + 1.8*10^{-5}$

$X^2 + 1.8*10^{-5}x - 1.8*10^{-5} = 0$

$x = 4.233650233*10^{-3}$

$pH = 2.37328502448$

Feb 26-7:44 AM

16.53 $CH_3CH(OH)COOH$ Lactic acid

0.1M $pH = 2.44$

Find K_a

H Lac

$CH_3CH(OH)COOH \rightarrow H^+ + CH_3CH(OH)COO^-$

$HLac \rightarrow H^+ + Lac^-$

	HLac	H^+	Lac^-
I	0.1	~~0~~	~~0~~
Δ	$-3.63*10^{-3}$	$+3.63*10^{-3}$	$+3.63*10^{-3}$
E		$3.63*10^{-3}$	

$pH = -\log[H^+]$

$2.44 = -\log[H^+]$

*Move ⊖ sign BEFORE anti-log *

$-2.44 = \log[H^+]$

$[H^+] = 3.63*10^{-3}$

$K_a = \frac{[H^+][Lac^-]}{[HLac]} = \frac{(3.63*10^{-3})^2}{(0.1 - 3.63*10^{-3})} =$

$\%\ ionization = \frac{3.63*10^{-3}}{0.1} * 100 = 3.63\%\ ionized$

Feb 26-8:28 AM

Find pH of 0.2M HCN.

$2*10^{-1}$

$HCN \Rightarrow H^+ + CN^-$

	HCN	H^+	CN^-
I	0.2	≈0	0
Δ	−x	+x	+x
E	0.2−x	x	x

$K_a = \frac{(x)(x)}{0.2} = \frac{4.9*10^{-10}}{1}$

$x^2 = 9.8*10^{-11}$

$x = 9.9*10^{-6}$

$pH = -\log(H^+)$

$= 5$

Feb 26-8:39 AM

1M H_2CO_3 pH = ?

Polyprotic acid TWO H^+'s.

$H_2CO_3 \rightarrow H^+ + HCO_3^-$

	H_2CO_3	H^+	HCO_3^-
I	1	≈0	0
Δ	−x	+x	+x
E	1−x	x	x

$K_{a_1} = \frac{(x)(x)}{1} = 4.3*10^{-7}$

$x = 6.557*10^{-4}$ $[H^+]$ from K_{a_1}

$pH = 3.183265787221$

$HCO_3^- \rightarrow H^+ + CO_3^{-2}$

	HCO_3^-	H^+	CO_3^{-2}
I	$6.557*10^{-4}$	$6.557*10^{-4}$	≈0
Δ	−x	+x	+x
E	$6.557*10^{-4}-x$	$6.557*10^{-4}+x$	x

$K_{a_2} = \frac{(x)(6.557*10^{-4})}{6.557*10^{-4}}$

$x = 5.6*10^{-11} = [H^+]$

$H^+_1 = 6.557*10^{-4}$

$H^+_2 = 5.6*10^{-11}$

$H^+_1 + H^+_2 = 6.55700056*10^{-4}$

$pH = -\log(H^+)$

3.183294779245

Feb 26-8:45 AM

Polyprotic acid

"ALL" (most) of H^+ ions come out in K_{a_1} First dissociation.

K_{a_2} and K_{a_3} are "insignificant" with any addition of $[H^+]$

Feb 26-9:09 AM

$K_a * K_b = K_w$

K_a ← acid; K_b ← base; K_w ← water

$1 * 10^{-14}$ at 25°C

HCN

$K_a = 4.9 * 10^{-10}$

$HCN \rightarrow H^+ + CN^-$ (A → CB)

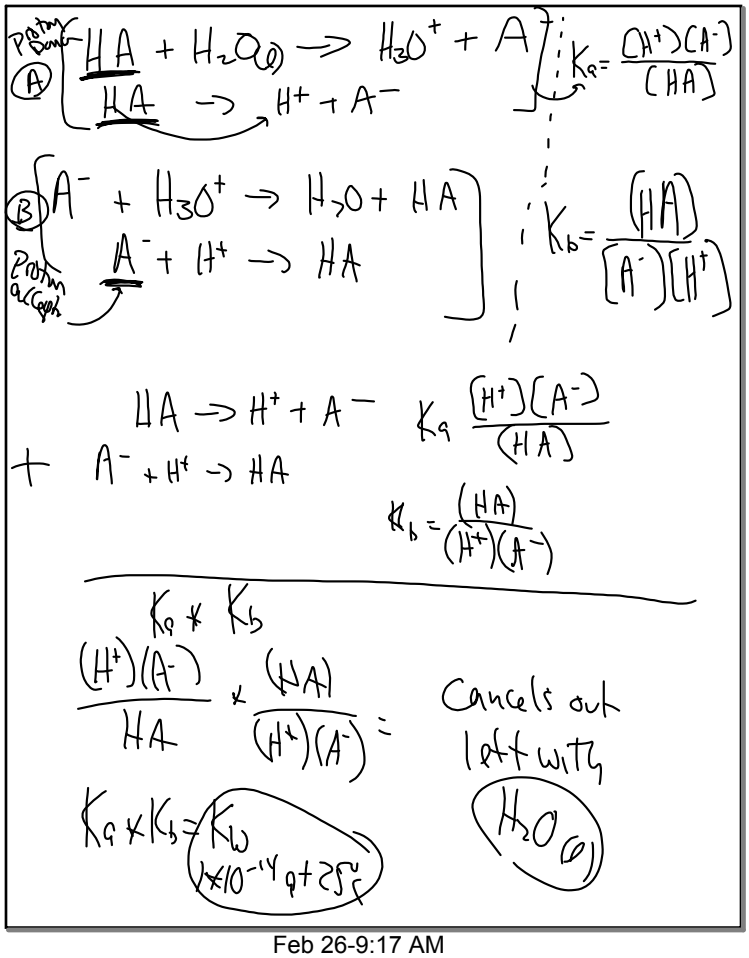
$K_a = 4.9 * 10^{-10}$

pH

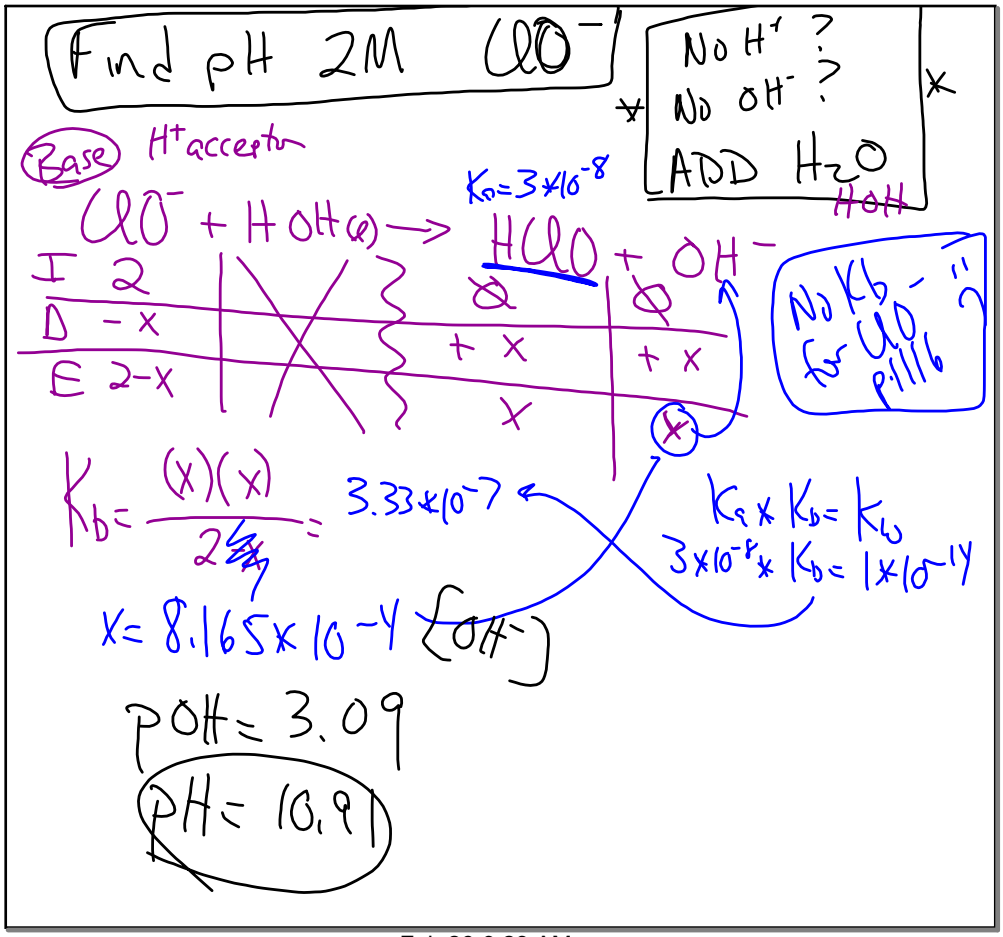
pH

$K_b = 2.04 * 10^{-5}$

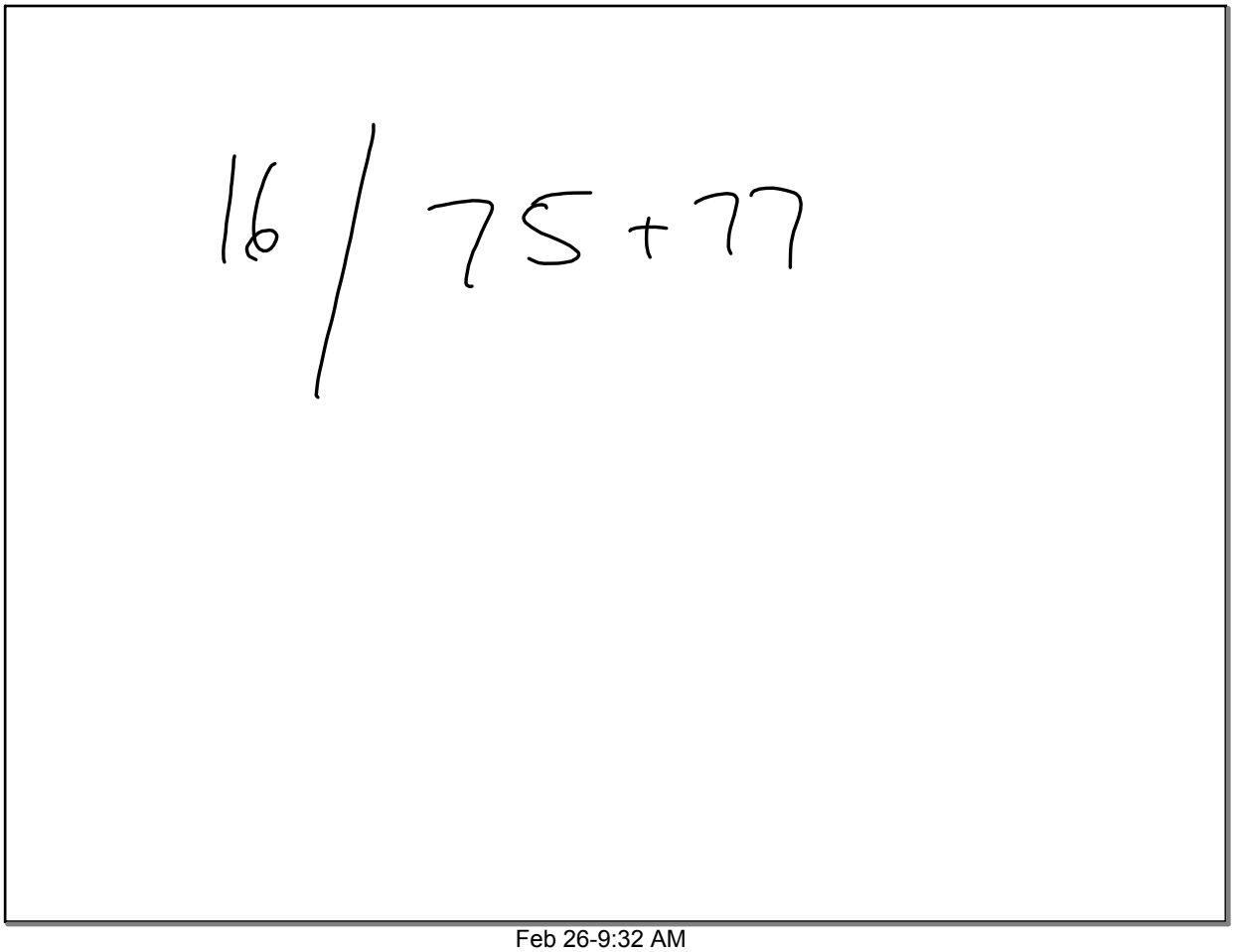
Feb 26-9:12 AM



Feb 26-9:17 AM



Feb 26-9:23 AM



Feb 26-9:32 AM