$C_t >> K_a$ -- Approximation in the Mass Balance equation. Assumes that the reaction does not go far to the right thus the reactant concentration can be approximated by the total concentration of the acid. Thus C_t = HA		
$C_tK_a >> K_w$	Approximation in the Charge Balance. Assumes the source of hydrogen ions in the system is from the acid dissociation and deprotonated concentration is greater than the OH^- conc. Thus $H^+ = A^-$.	Solution: $H^+ = \sqrt{CK_a}$
$C_tK_a \approx K_w$	No Charge Balance approximation.	Solution: $H^+ = \sqrt{K_w + CK_a}$
$C_tK_a << K_w$	Approximation in the Charge Balance. Assumes the source of hydrogen ions in the system is from the water equilibrium. Thus $OH^- >> A^-$ and $H^+ = OH^-$.	Solution: pH = 7

$C_t << K_a$ -- Approximation in the Mass Balance equation. Assumes that the reaction goes far to the right thus the deprotonated concentration can be approximated by the total concentration of the acid. Thus $C_t = A^-$		
$C_tK_a >> K_w$	Approximation in the Charge Balance. Assumes the source of hydrogen ions in the system is from the acid dissociation and deprotonated conc. Is greater than the OH^- conc. Thus $H^+ = A^-$. **This is valid only if pC << 7.**	Solution: $H^+ = A^- = C_t$ **Not valid when C is close to 10^{-7} .** Because, OH^- would be close to A^-.
$C_tK_a \approx K_w$	No Charge Balance approximation.	Solution: $(H^+)^2 - C(H^+) - K_w = 0$
$C_tK_a << K_w$	Approximation in the Charge Balance. Assumes the source of hydrogen ions in the system is from the water equilibrium. Thus $OH^- >> A^-$ and $H^+ = OH^-$.	Solution: pH = 7

$C_t = K_a$ -- No approximation in the Mass Balance equation. Thus $C_t \approx HA \approx A^-$		
$C_tK_a >> K_w$	Approximation in the Charge Balance. Assumes the source of hydrogen ions in the system is from the acid dissociation and deprotonated concentration. Is greater than the OH^- conc. Thus $H^+ = A^-$	Solution: $(H^+)^2 + K_a(H^+) - K_aC = 0$
$C_tK_a \approx K_w$	No Charge Balance approximation	Solution: $(H^+)^3 + K_a(H^+)^2 - (K_w + K_aC)(H^+) - K_wK_a = 0$
$C_tK_a << K_w$	Approximation in the Charge Balance. Assumes the source of hydrogen ions in the system is from the water equilibrium. Thus $OH^- >> A^-$ and $H^+ = OH^-$.	Solution: pH = 7