

Compute pH of 0.50 M NaCl(aq)



I(M)	0.50	—	0	$10^{-7} \approx 0$
C(M)	<u>-X</u>		<u>+X</u>	<u>+X</u>
E(M)	0.50-X		X	X

$$K_b = \frac{[\text{HCl}][\text{OH}^-]}{[\text{Cl}^-]} = \frac{x^2}{0.50-x} = 10^{-21}$$

$0.50 \geq 10^4 K_b$, so $0.50-x \approx 0.50$

$$\Rightarrow \frac{x^2}{0.50} = 10^{-21} \Rightarrow x = \sqrt{(0.50)(10^{-21})}$$
$$x = 10^{-11} = [\text{OH}^-]$$