$$\frac{x}{0.100-2x} = \sqrt{2.88 \times 10^{-3}}$$

$$x = (0.100-2x)\sqrt{2.88 \times 10^{-3}}$$

$$x = 0.100\sqrt{2.88 \times 10^{-3}} - 2x\sqrt{2.88 \times 10^{-3}}$$

$$x + 2x\sqrt{2.88 \times 10^{-3}} = 0.100\sqrt{2.88 \times 10^{-3}}$$

$$\left(1+2\sqrt{2.88 \times 10^{-3}}\right)x = 0.100\sqrt{2.88 \times 10^{-3}}$$

$$x = \frac{0.100\sqrt{2.88 \times 10^{-3}}}{1+2\sqrt{2.88 \times 10^{-3}}}$$

$$\sqrt{2.88 \times 10^{-3}} = \pm 0.0537$$

case 1 (+) case 2 (−)

0.00485 −0.00601

$C_2H_3O_2^-(aq) + H_2O(l) \rightleftharpoons HC_2H_3O_2(aq) + OH^-(aq)$

$$K_b = \frac{[HC_2H_3O_2][OH^-]}{[C_2H_3O_2^-]}$$

	$[C_2H_3O_2^-]$	$[HC_2H_3O_2]$	$[OH^-]$
I	2.75	0	~0
C	$-x$	$+x$	$+x$
E	$2.75-x$	x	x

$$K_b = \frac{(x)(x)}{2.75-x} = \frac{x^2}{2.75-x} = ?$$

$K_a \cdot K_b = K_w$

$$K_b = \frac{K_w}{K_a} = \frac{1.0\times10^{-14}}{1.8\times10^{-5}}$$

$$= 5.6\times10^{-10}$$

$$\frac{x^2}{2.75 - x} = 5.6 \times 10^{-10}$$

$$\frac{x^2}{2.75} = 5.6 \times 10^{-10}$$

$$x^2 = 1.5 \times 10^{-9}$$

$$x = 3.9 \times 10^{-5} = [OH^-]$$

EQUILIBRIUM

I What an equilibrium constant does and does not tell us.

What is <u>does</u> tell us:

The distribution of reactants and products at equilibrium.

What it does <u>NOT</u> tell us:

How long it will take to get to equilibrium

Equilibrium calculations you should be able to do:

1. If given all equilibrium concentrations (or pressures) calculate K_c (or K_p)
2. If given the value of K_c (or K_p) and all of the equilibrium concentrations (or pressures) except one, calculate that one missing equilibrium concentration (or pressure)
3. If given all of the initial concentrations (or pressures) and one equilibrium concentration (or pressure) be able to construct an ICE table and use it to find K_c (or K_p

4. If given all of the initial concentrations (or pressures) and the value of K_c (or K_p) be able to construct an ICE table and use it to find the final equilibrium composition.

5. Given all of the initial concentrations (or pressures) and the value of K_c (or K_p) decide whether or not the system is at equilibrium, and if not at equilibrium, determine the direction of reaction

6. Convert K_c to K_p and K_p to K_c
7. Be able to make the appropriate adjustments to equilibrium constants when reactions are modified.