pH calculations

weak acids   incomplete dissociation

What is the K_a of a 0.10 M CHOOH, pH = 2.38

$CHOOH \rightleftharpoons H^+ + CHOO^-$ $[H^+]_{eq} = 10^{-2.38} = 4.2 \times 10^{-3}$
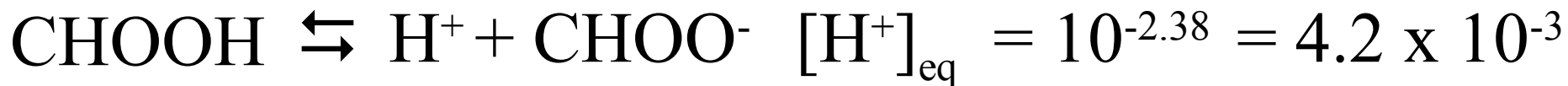
$$K_a = \frac{[H^+][CHOO^-]}{[CHOOH]} = \frac{x^2}{0.10 - \cancel{x}} = \frac{(4.2 \times 10^{-3})^2}{0.10} = 1.8 \times 10^{-4}$$

	[HA] (M)	[H$^+$] (M)	[A$^-$] (M)
Initial	0.10	0.00	0.00
Change	-x	+x	+x
Equil.	0.10 - x	x	x

$\dfrac{4.2 \times 10^{-3}}{0.10} \times 100$

4.2 %

% ionization