

For the reaction



we can calculate  $k_d$  as follows:

$$\frac{[A][B]}{[AB]} = \frac{1}{k_a} = k_d \quad (2)$$

Using

$$[A_0] = [A] + [AB] \quad (3)$$

$$[B_0] = [B] + [AB] \quad (4)$$

we rewrite eqn 2 so that it can be solved with the square (ABC) formula:

$$\frac{([A_0] - [AB])([B_0] - [AB])}{[AB]} = k_d \quad (5)$$

$$[A_0][B_0] - [AB]([A_0] + [B_0]) + [AB]^2 = k_d[AB] \quad (6)$$

$$[AB]^2 - [AB]([A_0] + [B_0] + k_d) + [A_0][B_0] = 0 \quad (7)$$

Percentage bound is:

$$\frac{[AB]}{[A_0]} \cdot 100\% \quad (8)$$