Answer on the question #81998 – Chemistry – General Chemistry

At first, we ought to find ion concentration:

$[H^+] = 10^{-pH} = 10^{-9.5} = 3.16 \times 10^{-10}$ mol/dm^{-3}

$K_w = [H^+_{(aq)}] [OH^-_{(aq)}] = 1 \times 10^{-14}$ mol$^{2/}$dm^{-6}

$[OH^-_{(aq)}] = K_w/[H^+_{(aq)}] = 1 \times 10^{-14} / 3.16 \times 10^{-10} = 3.16 \times 10^{-5}$ mol/dm^{-3}

Now, let's solve:

$K_b = [OH^-_{(aq)}]^2/[B_{(aq)}] = (3.16 \times 10^{-5})^2 / 0.50 = 2.00 \times 10^{-9}$ mol/dm^{-3}

$pK_b = -\log(2.00 \times 10^{-9}) = 8.70$