The pH scale

The pH scale ranges from 0 to 14.
Acidic substances have a pH of less than 7.
Water is neutral and has a pH of 7.
Basic substances have a pH of greater than 7.

pH is the $-\log[H^+]$
for example, if $[H^+] = 0.001$ M ($1x10^{-3}$ M),
then $pH = -\log[H^+] = 3$

conversely,
$[H^+]=10^{-pH}$
If pH = 2, $[H^+]=10^{-2} = 0.01$ M

$pOH = -\log [OH^-]$
$pH + pOH = 14$

$[H^+][OH^-] = 1x10^{-14}$
$[OH^-] = 1x10^{-14}/[H^+]$

Example problem:
Given that $[H^+] = 0.052$ M, find pOH.

A: There are two ways to solve this problem.
a) knowing $[H^+]$, find pH, then find pOH from pOH = 14-pH.

$pH = -\log [H^+] = -\log(0.052\ M) = 1.28$
Note: there were 2 sig. figs. in the $[H^+]$, so pH is expressed with two decimal places (two digits after the decimal point).

$pOH = 14-pH = 14-1.28 = 12.72$

b) knowing $[H^+]$, find $[OH^-]$, then calculate pOH

$[OH^-] =1.0x10^{-14}/[H^+] = 1.0x10^{-14}/0.052 = 1.9x10^{-13}$

$pOH = -\log[OH^-] = -\log(1.9x10^{-13}) = 12.72$