Application of the Logarithm: pH of a Liquid

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Definition of pH

▸ The pH of a substance is defined in terms of the hydronium ion concentration.

$$pH = -\log[H_3O^+]$$

Problem

▸ A fruit juice has a pH of 2.8.
▸ Find the hydronium ion concentration of the juice?

Solution

$$pH = 2.8$$

$$y = concentration\ of\ H_3O^+$$

$$2.8 = -\log[H_3O^+]$$

$$-2.8 = \log[y]$$

$$10^{-2.8} = y$$

$$\boxed{y \approx 0.001585}$$