

Algebra 2 7.6

base 10



Solve exponential equations and inequalities using common logs

Evaluate logarithmic expressions by changing bases

Use log expressions to evaluate pH and H⁺ concentration

base

exponent

logarithm

default

common log

pH = -log H⁺

Whiteboards

$$\log 1000 = ?$$

Example 4 Solve Exponential Inequalities Using Logarithms

Solve $3^{5y} < 7^{y-2}$. Round to the nearest ten-thousandth.

$$\log 3^{5y} < \log 7^{y-2}$$

$$5y \cdot 0.4771 < (y-2)(0.8451)$$

$$2.3855y < 0.8451y - 1.6902$$

$$\frac{1.5448y}{1.8445} < \frac{-1.6902}{1.8445}$$

$$y < 0.9163$$

Common 10

Solve each inequality.

4A. $3^{2x} \geq 6^{x+1}$

$$2x (\quad) \geq (x+1) (\quad)$$

$$11. 6^{p-1} \leq 4^p$$

$$(p-1)(0.7782) \leq p(0.6021)$$

$$0.7782p - 0.7782 \leq 0.6021p$$

$$0.1761p \leq 0.7782$$

$$p \leq 4.4191$$

$$-pH = \log H^+$$

$$pH = -\log H^+$$



Real-World Example 2 Quotient Property

SCIENCE The pH of a substance is defined as the concentration of hydrogen ions $[H^+]$ in moles. It is given by the formula Find the amount of hydrogen in a liter of acid rain that has a pH of 4.2.

$$-4.2 = \log H^+$$

$$10^{(-4.2)} = H^+$$

$$H^+ = 0.000063096$$
$$= 6.3096 \times 10^{-5}$$

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$$10^{(-4.2) + 5 - 5}$$
$$10^{0.8} \times 10^{-5}$$

$$pH = -\log H^+$$

Use the formula $pH = -\log [H^+]$ to find the pH of each substance given its concentration of hydrogen ions. Round to the nearest tenth.

4. milk: $[H^+] = 2.51 \times 10^{-7}$ mole per liter 6.6

5. acid rain: $[H^+] = 2.51 \times 10^{-6}$ mole per liter

6. black coffee: $[H^+] = 1.0 \times 10^{-5}$ mole per liter

$$\frac{pH}{-1} = \frac{-\log(2.51 \times 10^{-7})}{-1}$$

$$-pH = \log(2.51 \times 10^{-7})$$

$$\log(.000000251)$$

$$\frac{-pH}{-1} = \frac{-6.6}{-1}$$

Speed dating?

WB 7.6 prac.

ords + 4, 6