Precalc 11.5 $2^3 = 8$ $\log_2 8 = 3$

base 10

Find common logs and antilogs
Solve log equations and inequalities
Change bases using logs

$10^2 = 100$ $\log_{10} 100 = 2$

$\log 100 = 2$

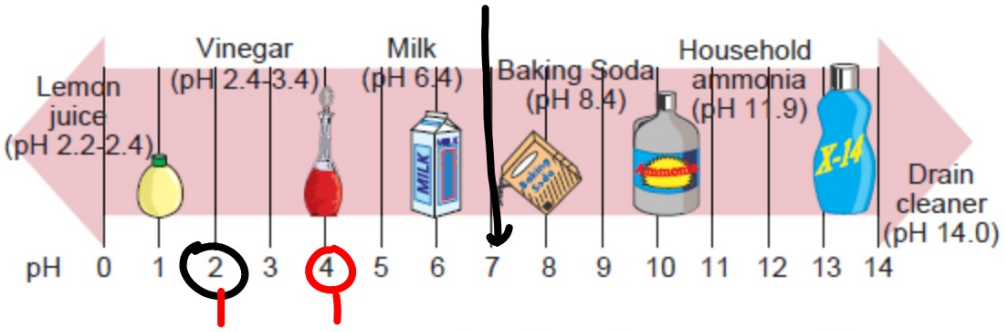
base

whiteboards

exponent

logarithm

common log



Strong acid

distilled water

Strong base

pH of vomit?

$10^3 \cdot 10^2$

10^5

Use what you know about logs and exponents.
hint: scientific notation
(not asking for calculator use)

1 Given that $\log 7 = 0.8451$, evaluate each logarithm.

a. $\log 7{,}000{,}000$

b. $\log 0.0007$

$\log_{10}(7 \cdot 1{,}000{,}000)$

$\log_{10} 7 + \log_{10} 1{,}000{,}000$

$\log_{10} 7 + \log_{10} 10^6$

$0.8451 + 6$

$\log_{10} 7{,}000{,}000 = 6.8451$

$\log_{10} \frac{7}{10{,}000}$

$\log_{10}(7 \div 10{,}000)$

$\log_{10} 7 - \log_{10} 10^4$

$0.8451 - 4$

$\log_{10} 0.0007 = -3.1549$

$\therefore$

$10^{-3.1549} = 0.0007$

log = exponent antilog = number

what is the base?

31. antilog 0.3012 = number

32. log 1891.91 = exp

33. antilog 0.33736

$10^{0.3012} = 2$

$10^{?} = 1891.91$

3.1 1259

3.2 1585

3.3 1995

3.25 1778

3.27 1862

3.28 1905

3.275 1884

3.278 1897

pH=-log[H+]

2 **CHEMISTRY** Refer to the application at the beginning of the lesson. If the water being tested contains 7.94×10^{-9} moles of H^+ per liter, what is the pH level of the water?

$pH = -\log_{10}(H^+)$

$10^{-pH} = H^+$

$(7.94e-9)$

$pH = -[\log_{10}(7.94 \times 10^{-9})]$

$-1[\log_{10} 7.94 + \log_{10} 10^{-9}]$

$-1[0.899 + -9]$

$-1(-8.1) = 8.1$

pH=-log[H+]

6 CHEMISTRY Refer to the application at the beginning of the lesson. Technicians at a water treatment plant determine that the water supply has a pH of 6.7. What is the concentration of hydrogen ions in the tested water?

$pH = -\log_{10} H$

$-1 \qquad -1$

$-pH = \log_{10} H$

$10^{-pH} = H$

$10^{-6.7} = 2 \times 10^{-7}$

$2e^{-7}$

Use properties of logs

3 **Evaluate each expression.**

a. $\log 5(2)^3$

$\log_{10} 5 + \log_{10} 2^3$

$\log_{10} 5 + 3\log_{10} 2$

$0.6989 + 0.9031$

1.6020

b. $\log \frac{19^2}{6}$

$10^{1.6020} =$

5-9
19-33

4 Graph $y > \log(x - 4)$.

5 Find the value of $\log_9 1043$

Find the value of each logarithm

11. $\log_{12} 18$

12. $\log_8 15$

Estimate first

Evaluate each expression.

28. $\log 98.2$ **29.** $\log 894.3$ **30.** $\text{antilog } -0.0600$