Precalc   11.5

base 10
↑
Find common logs and antilogs
Solve log equations and inequalities
Change bases using logs

$\log_{10} 100 = ?$

$\log 100$

$10^x = 100$

$x = 2$

base

exponent

logarithm

common log

pH scale showing: Lemon juice (pH 2.2-2.4), Vinegar (pH 2.4-3.4), Milk (pH 6.4), Baking Soda (pH 8.4), Household ammonia (pH 11.9), Drain cleaner (pH 14.0)

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

10^5
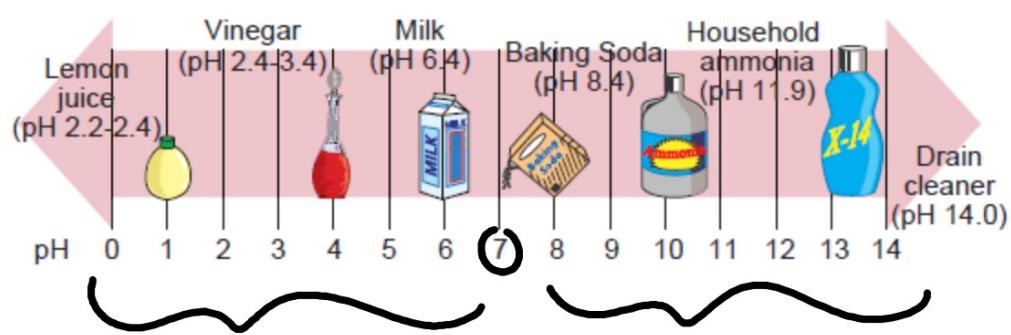
Use what you know about logs and exponents.
hint: scientific notation
(not asking for calculator use)

$\log 7 \times 10^{-4} = \log 7 + \log 10^{-4}$
$0.8451 + -4 = \boxed{-3.1549}$

$10^{-3.1549}$

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

a. log 7,000,000

$\log 7 \times 10^{6}$
$\log 7 + \log 10^{6}$ $6 \log 10$
$0.8451 + 6 = \boxed{6.8451}$
$10^{6.8451} =$

b. log 0.0007

$\log_{10} 10 = ?$
$10^{x} = 10$

log = exponent   antilog = number   what is the base?

31. antilog 0.3012   **32.** log 1891.91 $= 3.2769$ **33.** antilog 0.33736

$$10^{0.3012}$$
$$= 2.0008$$

$$10^{?} = 1891.91$$
$$10^{2} = 100$$
$$10^{3} = 1000$$
$$10^{4} = 10,000$$

$$10^{0.33736}$$
$$2.1745$$

$$pH = -\log[H+]_{10}$$

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?

$$pH = -\log(7.94 \times 10^{-9}) \qquad = 8.1$$

$$- (\log 7.94 + \log 10^{-9})$$

$$- - 8.100$$

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?

$$\frac{6.7}{-1} = \frac{-\log_{10}[H^+]}{-1}$$

$$-6.7 = \log H^+$$

$$10^{-6.7} = H^+$$

$$2 \times 10^{-7} \quad 0.0000002$$

Use properties of logs

3 Evaluate each expression.

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

     40

        = $\log 5 + 3\log 2$

        = $0.6990 + 0.9031$

b. $\log \dfrac{19^2}{6}$ = $\boxed{1.6021}$

$10^{1.6021} = 40$

$\log 19^2 - \log 6$

$2\log 19 - \log 6$

$2.5575 - 0.7782$ = $\boxed{1.7793}$

$\left(10^{1.7793} \right)$

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

$10^?$

$x - 4 > 0$
$x > 4$

$y = \log_{10}(x - 4)$

$x - 4 = 10^y$

$x - 4 + 4 = 10^y + 4$

$x = 10^y + 4$

x	y
14	1
5	0
4.1	-1

$| |$
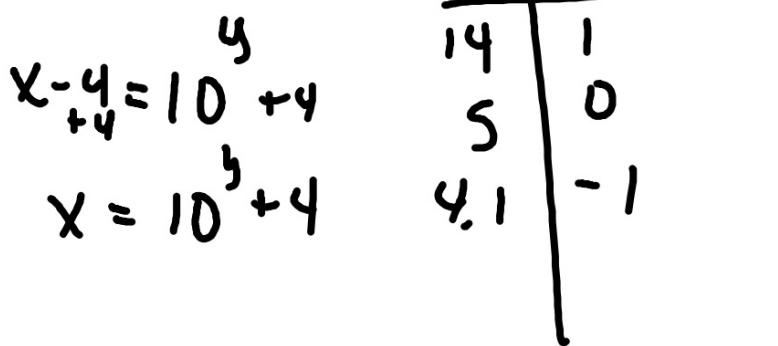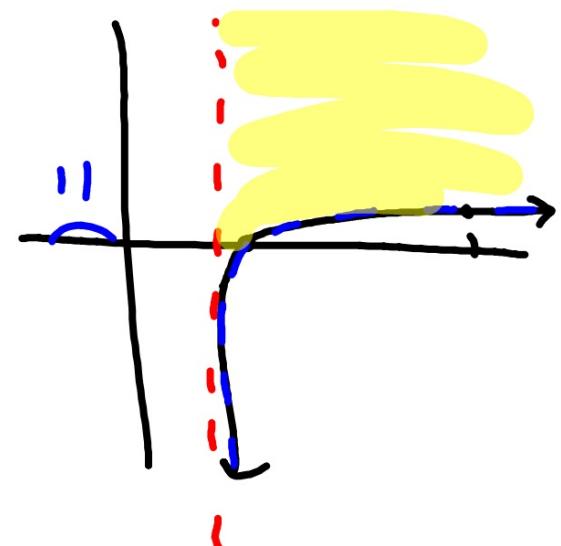
5 Find the value of $\log_9 1043$

Find the value of each logarithm

11. $\log_{12} 18$

12. $\log_8 15$

ıate first

Evaluate each expression.

28. log 98.2   **29.** log 894.3   **30.** antilog −0.0600