

**EXPONENTIAL FORM** Rewrite the equation in exponential form.  $N = b^a$

3.  $\log_4 16 = 2$       4.  $\log_7 343 = 3$       5.  $\log_6 \frac{1}{36} = -2$

$\log_b N = a$

$16 = 4^2$        $343 = 7^3$        $\frac{1}{36} = 6^{-2}$

**EVALUATING LOGARITHMS** Evaluate the logarithm without using a calculator.

8.  $\log_{15} 15 = x$       9.  $\log_7 49 = x$       10.  $\log_6 216 = x$

$15 = 15^x$        $49 = 7^x$        $216 = 6^x$

$x = 1$        $x = 2$        $x = 3$

**CALCULATING LOGARITHMS** Use a calculator to evaluate the logarithm.

20.  $\log 14$

$\log(14)$   
1.146128036

21.  $\ln 6$

$\ln(6)$   
1.791759469

22.  $\ln 0.43$

$\ln(0.43)$   
-.8439700703

$$\begin{array}{l} \log(14) \\ \ln(6) \\ \ln(0.43) \end{array}$$

**USING INVERSE PROPERTIES** Simplify the expression.

28.  $7^{\log_7 x} = \underline{\underline{x}}$

$b^{\log_b x} = x$

32.  $\log_6 36^x$

$\log_6 (6^2)^x$

$\log_b b^x = x$

$\log_6 6^{2x} = \underline{\underline{2x}}$

**FINDING INVERSES** Find the inverse of the function.

37.  $y = \log_8 x$

Handwritten work for problem 37:  
 $x = \log_8 y$   
 $y = 8^x$   
 Diagrams showing the relationship between variables:  $x \leftrightarrow a$ ,  $y \leftrightarrow N$ , and  $8 \leftrightarrow b$ .

38.  $y = 7^x$

Handwritten work for problem 38:  
 $x = \log_7 y$   
 $\log_7 x = y$  (circled)  
 Diagrams showing the relationship between variables:  $x \leftrightarrow N$ ,  $y \leftrightarrow a$ , and  $7 \leftrightarrow b$ .  
 General formula:  $\log_b N = a$

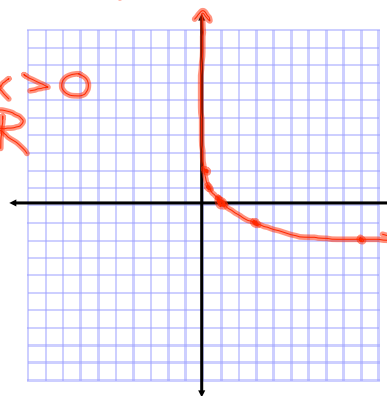
**GRAPHING FUNCTIONS** Graph the function. State the domain and range.

Handwritten work for problem 47:

x	y
$(\frac{1}{3})^{-2}$	9
$(\frac{1}{3})^{-1}$	3
1	0
$\frac{1}{3}$	1
$\frac{1}{9}$	2
$\frac{1}{243}$	5

47.  $y = \log_{1/3} x$   
 $N = b^a$   
 $x = (\frac{1}{3})^y$   
 Diagrams showing the relationship between variables:  $x \leftrightarrow a$ ,  $y \leftrightarrow b$ , and  $N$ .

D:  $x > 0$   
 R:  $\mathbb{R}$



<p>42. <math>y = 2^x - 3</math></p> <p><math>x = 2^y - 3</math></p> <p><math>+3 \quad +3</math></p> <p><math>(x+3) = 2^y</math></p> <p><math>\uparrow \quad \uparrow \quad \uparrow</math></p> <p><math>N \quad b \quad a</math></p> <p><u><math>\log_2(x+3) = y</math></u></p>	<p>44. <math>y = 6 + \log x</math></p> <p><math>x = 6 + \log_{10} y</math></p> <p><math>\underline{x} - 6 = \log_{10} y</math></p> <p><math>\uparrow \quad \uparrow \quad \uparrow</math></p> <p><math>a \quad b \quad N</math></p> <p><math>x-6</math></p> <p><u><math>y = 10^{x-6}</math></u></p>
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