

Day 03

Practice

Logarithms and Logarithmic Functions

Write each equation in exponential form.

1. $\log_6 216 = 3$ $6^3 = 216$

2. $\log_2 64 = 6$ $2^6 = 64$

3. $\log_3 \frac{1}{81} = -4$ $3^{-4} = \frac{1}{81}$

4. $\log_{10} 0.00001 = -5$

$10^{-5} = 0.00001$

5. $\log_{25} 5 = \frac{1}{2}$

$25^{\frac{1}{2}} = 5$

6. $\log_{32} 8 = \frac{3}{5}$

$32^{\frac{3}{5}} = 8$

Write each equation in logarithmic form.

7. $5^3 = 125$ $\log_5 125 = 3$

8. $7^0 = 1$ $\log_7 1 = 0$

9. $3^4 = 81$ $\log_3 81 = 4$

10. $3^{-4} = \frac{1}{81}$

$\log_3 \frac{1}{81} = -4$

11. $(\frac{1}{4})^3 = \frac{1}{64}$

$\log_{\frac{1}{4}} \frac{1}{64} = 3$

12. $7776^{\frac{1}{5}} = 6$

$\log_{7776} 6 = \frac{1}{5}$

Evaluate each expression.

13. $\log_3 81$ 4

14. $\log_{10} 0.0001$ -4

15. $\log_2 \frac{1}{16}$ -4

16. $\log_{\frac{1}{3}} 27$ -3

17. $\log_9 1$ 0

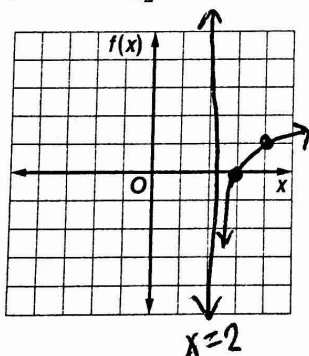
18. $\log_8 4$ $\frac{2}{3}$

19. $\log_7 \frac{1}{49}$ -2

20. $\log_6 6^4$ 4

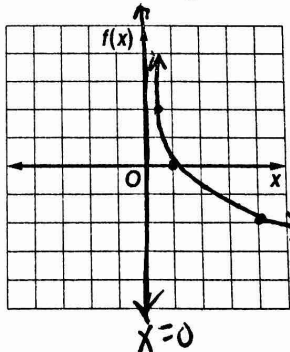
Graph each function.

21. $f(x) = \log_2(x-2)$



x	y
3	0
4	1

22. $f(x) = -2 \log_4 x$



x	y
1/4	2
1	0
4	-2

23. **SOUND** An equation for loudness, in decibels, is $L = 10 \log_{10} R$, where R is the relative intensity of the sound. Sounds that reach levels of 120 decibels or more are painful to humans. What is the relative intensity of 120 decibels? $10 \log_{10} R = 120 \Rightarrow \log_{10} R = 12$

24. **INVESTING** Maria invests \$1000 in a savings account that pays 4% interest compounded annually. The value of the account A at the end of five years can be determined from the equation $\log_{10} A = \log_{10} [1000(1 + 0.04)^5]$. Write this equation in exponential form.

$A = 1000(1 + 0.04)^5$

If $\log_b m = \log_b n$
then $m = n$

$10^{12} = R$

Logarithms and Logarithmic Functions

Write each equation in exponential form.

1. $\log_3 243 = 5$ $3^5 = 243$

2. $\log_4 64 = 3$ $4^3 = 64$

3. $\log_9 3 = \frac{1}{2}$ $9^{\frac{1}{2}} = 3$

4. $\log_5 \frac{1}{25} = -2$ $5^{-2} = \frac{1}{25}$

Write each equation in logarithmic form.

5. $2^3 = 8$ $\log_2 8 = 3$

6. $3^2 = 9$ $\log_3 9 = 2$

7. $8^{-2} = \frac{1}{64}$ $\log_8 \frac{1}{64} = -2$

8. $(\frac{1}{3})^2 = \frac{1}{9}$ $\log_{\frac{1}{3}} \frac{1}{9} = 2$

Evaluate each expression.

9. $\log_5 25$ 2

10. $\log_9 3$ $\frac{1}{2}$

11. $\log_{10} 1000$ 3

12. $\log_{125} 5$ $125^x = 5$
 $5^{3x} = 5^1$ $3x = 1$ $\frac{1}{3}$

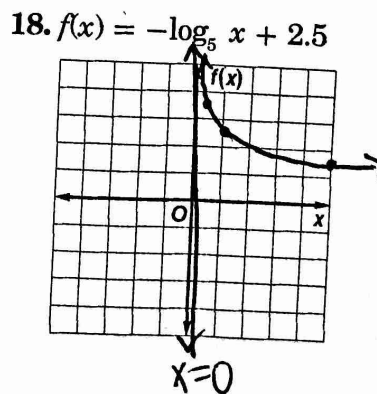
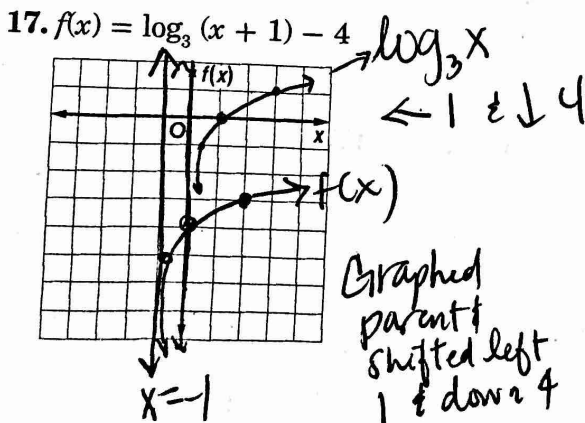
13. $\log_4 \frac{1}{64}$ -3

14. $\log_5 \frac{1}{625}$ -4

15. $\log_8 512$ 3

16. $\log_{27} \frac{1}{3}$ $27^x = \frac{1}{3}$
 $3^{3x} = 3^{-1}$ $3x = -1$ $-\frac{1}{3}$

Graph each function.



x	y
1	$-\log_5 1 + 2.5$ $0 + 2.5$ 2.5
$\frac{1}{5}$	$-\log_5 \frac{1}{5} + 2.5$ $-(-1) + 2.5$ 3.5
5	$-\log_5 5 + 2.5$ $-1 + 2.5$ 1.5