

Converting Between Logarithmic and Exponential Forms

Rewrite in logarithmic form.

1. $6^3 = 216$

$$\log_6 216 = 3$$

2. $7^2 = 49$

$$\log_7 49 = 2$$

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

$$\log_5 \frac{1}{25} = -2$$

Rewrite in exponential form.

4. $\log_3 9 = 2$

$$3^2 = 9$$

5. $\log 1000 = 3$

$$10^3 = 1000$$

6. $\ln 7 = 1.95$

$$e^{1.95} = 7$$

Evaluating Logarithms

Evaluate each expression. Round to two decimal places, following the rules of rounding.

7. $\log_2 8$

$$3$$

8. $\log 56$

$$1.75$$

9. $\ln 12$

$$2.48$$

Solving Logarithmic EquationsSolve for x . Apply a property of logarithms when needed.

10. $\log_9 x = 2$

$$x = 81$$

11. $\ln(x+1) = 9$

$$x = 8102.08$$

12. $\log_3(2x+7) = 4$

$$x = 37$$

13. $\ln(2x-8) - 1 = 3$

$$x = 31.30$$

14. $\log_x 16 = 2$

$$x = 4$$

15. $\log_4 3x^2 + \log_4 2x = 4$

$$x = 3.49$$

16. $\log_8(6x-4) = \log_8(2x+12)$

$$x = 4$$

17. $\log x^2 - \log 3x = 2$

$$x = 300$$

Solving Exponential Equations

Solve for x.

18. $5^x = 22$

$x = 1.92$

19. $e^{3x} = 11$

$x = .80$

20. $3^{2x} - 6 = 17$

$x = 1.43$

21. $7^{x+3} = 40$

$x = -1.10$

22. $2 \cdot 9^{3x-8} = 100$

$x = 3.24$

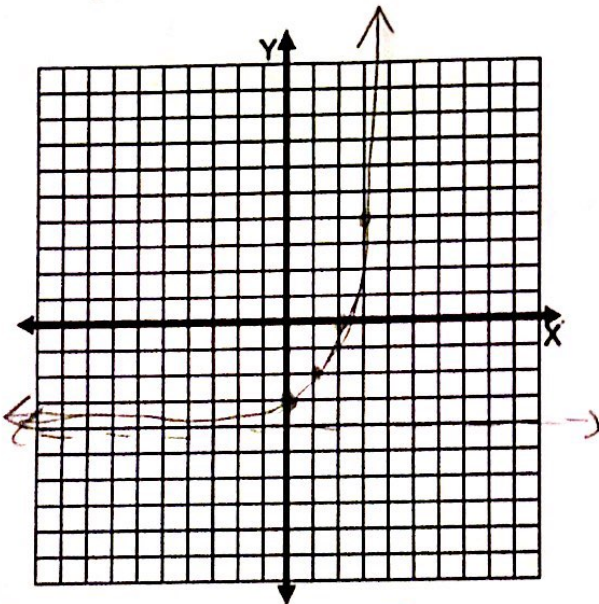
23. $10^x = 4^{2x-3}$

SKIP!

Graphs of Exponential and Logarithmic Functions

Graph each function by using your calculator to generate the t-table. State the domain, range, and asymptote.

24. $f(x) = 2^x - 4$



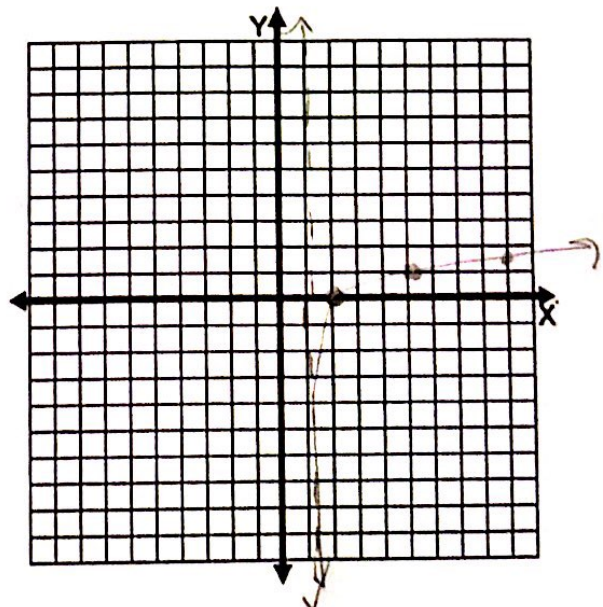
Domain: $(-\infty, \infty)$

Range: $(-4, \infty)$

Horizontal Asymptote:

$y = -4$

25. $f(x) = \log_4(x-1)$



Domain: $(1, \infty)$

Range: $(-\infty, \infty)$

Vertical Asymptote:

$x = 1$

Growth and Decay

26. The number of bacteria present in a colony is 180 at 11 a.m. and the number of bacteria doubles every hour. How many will be present at 8 p.m.?

92160 bacteria

27. If a gallon of milk costs \$3 now and the price is increasing by 10% each year, how long before milk costs \$10 per gallon?

12.632 years

28. Dinner at your grandfather's favorite restaurant now costs \$25.25 and has been increasing steadily at 4% per year. How much did it cost 50 years ago when he was dating your grandmother?

\$ 3.55

29. The value of an iPod purchased for \$300 decreases by 6% each year. How long until the iPod is worth \$90?

19.458 years

Compound Interest

30. How much money will be available in 7 years if \$400 is invested at 3% interest compounded continuously?

\$ 493.47

31. How long will it take for \$600 to double if it is invested at 4% interest compounded monthly?

\$ 17.358 years

32. How much money must be invested at 6.5% interest compounded quarterly for \$50,000 to be available in 7 years?

\$ 31,838.63

33. How long will it take to have \$1400 if \$900 is invested at 7% interest compounded continuously?

6.312 years