Unit 8 Review - Exponents and Logarithms NAME _____

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 Equations

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

$x = 3.26$

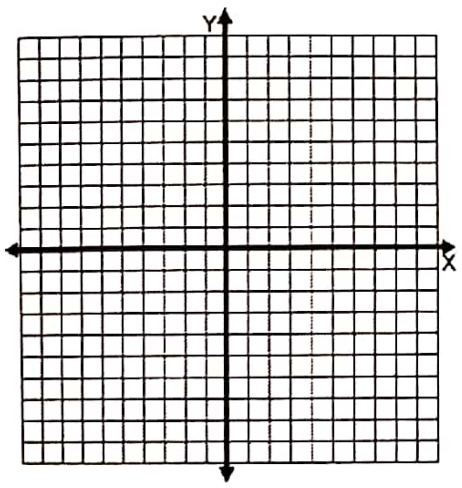
23. $10^x = 4^{2x-3}$

$x = 8.85$

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

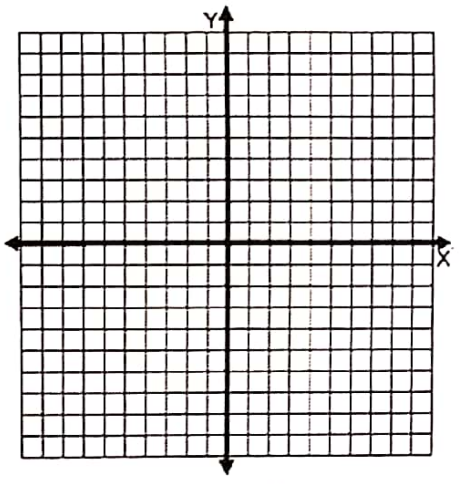


Domain: $(-\infty, \infty)$

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.?

92,160 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?

12.63 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?

19.46 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?

17.36 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?

6.31 years