QUIZ for Lessons 7.1–7.3

1, 2, 4 – 8, 13

Graph the function. State the domain and range.

1. $y = 2 \cdot 3^{x-2}$ *(p. 478)*
2. $y = \left(\frac{2}{5}\right)^x$ *(p. 486)*
3. $f(x) = \left(\frac{3}{8}\right)^x + 2$ *(p. 486)*

Simplify the expression. *(p. 492)*

4. $3e^4 \cdot e^3$
5. $(-5e^{3x})^3$
6. $\frac{e^{4x}}{5e}$
7. $\frac{8e^{5x}}{6e^{2x}}$

Graph the function. State the domain and range. *(p. 492)*

8. $y = 2e^x$
9. $y = 3e^{-2x}$
10. $y = e^{x+1} - 2$
11. $g(x) = 4e^{-3x} + 1$

12. **TV SALES** From 1997 to 2001, the number n (in millions) of black-and-white TVs sold in the United States can be modeled by $n = 26.8(0.85)^t$ where t is the number of years since 1997. Identify the decay factor and the percent decrease. Graph the model and state the domain and range. Estimate the number of black-and-white TVs sold in 1999. *(p. 478)*

13. **FINANCE** You deposit $1200 in an account that pays 4.5% annual interest compounded continuously. What is the balance after 5 years? *(p. 492)*

7.4 Evaluate Logarithms and Graph Logarithmic Functions

Definition of Logarithm with base b:

Let b and y be positive numbers, $b \neq 1$.

The logarithm of y with base b is written $\log_b y = x$

$\log_b y = x$ if and only if $b^x = y$.

$\log_b y$ is read "log base b of y

logs = exponents

logs = exponents

Example: Rewrite in exponential form:

a) $\log_3 81 = 4$ $\quad 3^4 = 81$

b) $\log_7 7 = 1$ $\quad 7^1 = 7$

c) $\log_{14} 1 = 0$ $\quad 14^0 = 1$

Example: Rewrite in logarithmic form:

a) $3^2 = 9$ $\quad \log_3 9 = 2$

b) $\left(\frac{1}{2}\right)^{-2} = 4$ $\quad \log_{\frac{1}{2}} 4 = -2$

logs = exponents

Example: Evaluate

a) $\log_3 27 = 3$ b) $\log_{1/2} 2 = -1$ c) $\log_4 2 = \frac{1}{2}$

$\log_3 27 = x$

$3^x = 27$

$x = 3$

$\left(\frac{1}{2}\right)^{-1} = 2$

Using your calculator:

log button means $\log_{10}$ known as common log

ln button means $\log_e$ known as natural log

log 100 means $\log_{10}100$, what should the answer be? Try it.

Example: Evaluate with calculator

a) log 5

.6989

b) ln 2

.693

Example: Find the inverse.

a) $y = 8^x$

$x = 8^y$

$\log_8 x = y$

b) $y = \log_3(x - 4)$

$x = \log_3(y - 4)$

$3^x = y - 4$

$3^x + 4 = y$

Inverse properties:

$\log_b x = y$ and $b^x = y$ are inverses

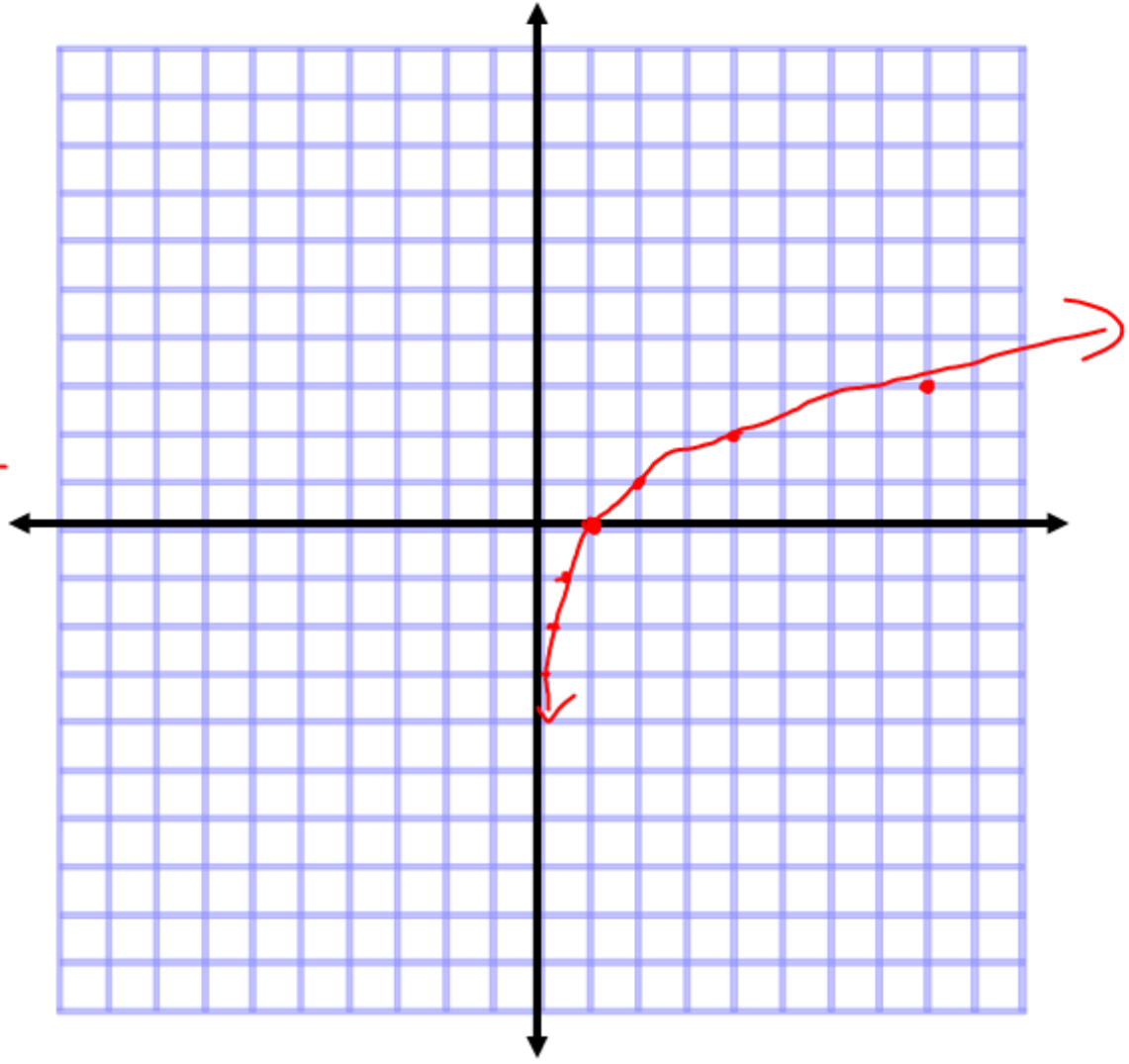
so: $\log_b(b^x) = x$ and $b^{\log_b x} = x$

Graphing Logarithms:

$\log_2 x = y$

$2^y = x$

x	y
1	0
2	1
4	2
8	3
$\frac{1}{2}$	-1
$\frac{1}{4}$	-2



D: $x > 0$

R: all real #s

asy: $x = 0$

A#26

Pg 503

4, 6, 8, 9, 12 – 14, 19, 22, 26, 28, 29, 34, 38, 40, 41, 45, 51, 46, 52

EXPONENTIAL FORM **Rewrite the equation in exponential form.**

4. $\log_7 343 = 3$ **6.** $\log_{64} 1 = 0$

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

8. $\log_{15} 15$ **9.** $\log_7 49$

12. $\log_9 1$ **13.** $\log_{1/2} 8$ **14.** $\log_3 \frac{1}{27}$

19. $\log_{11} 121$

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

22. $\ln 0.43$ **26.** $\log 0.746$

USING INVERSE PROPERTIES **Simplify the expression.**

28. $7^{\log_7 x}$ **29.** $\log_5 5^x$ **34.** $\log_5 125^x$