Name: _____ Class: _____ Date: _____ ID: A

Chapter 7 Test Review

Write the equation in logarithmic form.

___ 1. $2^5 = 32$

a. $\log 32 = 5 \cdot 2$
b. $\log_2 32 = 5$
c. $\log 32 = 5$
d. $\log_5 32 = 2$

___ 2. $125^{\frac{4}{3}} = 625$

a. $\log_{\frac{4}{3}} 625 = 125$
b. $3 \log_4 625 = 125$
c. $\log_{125} 625 = \frac{4}{3}$
d. $\log_{625} 125 = \frac{3}{4}$

Write the equation in exponential form.

___ 3. $\log_4 \frac{1}{16} = -2$

a. $4^{\frac{1}{2}} = 16$
b. $4^2 = 16$
c. $16^{\frac{1}{2}} = 4$
d. $4^{-2} = \frac{1}{16}$

___ 4. $\log_{(a+b)} c = 16$

a. $(a + b)^{16} = c$
b. $16^{(a+b)} = c$
c. $c^{16} = (a + b)$
d. $(a + b)^c = 16$

Evaluate the logarithm.

___ 5. $\log_5 \frac{1}{625}$

a. -3 b. 5 c. -4 d. 4

___ 6. $\log_3 243$

a. 5 b. -5 c. 4 d. 3

____ 7. The table shows the location and magnitude of some notable earthquakes. How many times more energy was released by the earthquake in Mexico than by the earthquake in Afghanistan? Use the given equation for comparing earthquake intensity level and magnitude.

$$\log \frac{I_1}{I_2} = M_1 - M_2$$

Earthquake Location	Date	Richter Scale Measure
Italy	October 31, 2002	5.9
El Salvador	February 13, 2001	6.6
Afghanistan	May 30, 1998	6.9
Mexico	January 22, 2003	7.6
Peru	June 23, 2001	8.1

a. about 0.70 times as much energy
b. about 12.63 times as much energy
c. about 7 times as much energy
d. about 5.01 times as much energy

____ 8. The pH of a liquid is a measure of how acidic or basic it is. The concentration of hydrogen ions in a liquid is labeled $\left[H^+\right]$. Use the formula $pH = -\log\left[H^+\right]$ to find the pH level, to the nearest tenth, of a liquid with $[H^+]$ about 6.5×10^{-3}.

a. –3.8 b. 3.8 c. 2.2 d. 3.0

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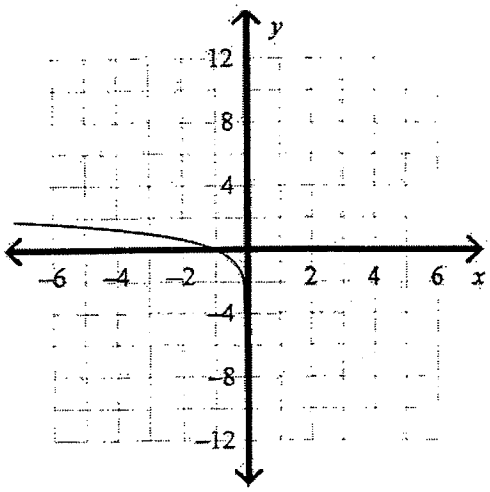
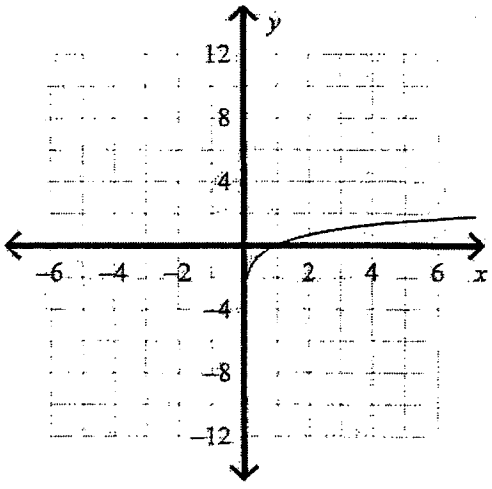
Graph the logarithmic equation.

___ 9. $y = \log_3 x$

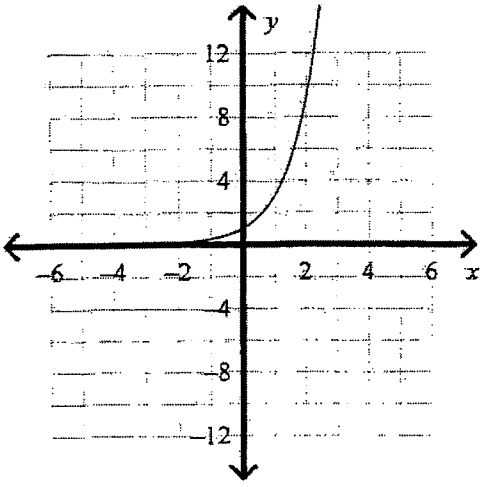
a.



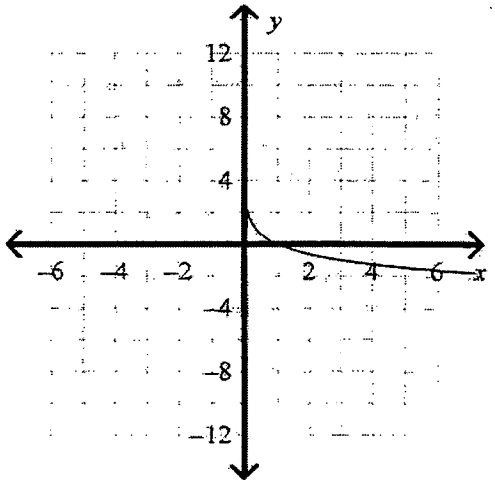
c.



b.



d.



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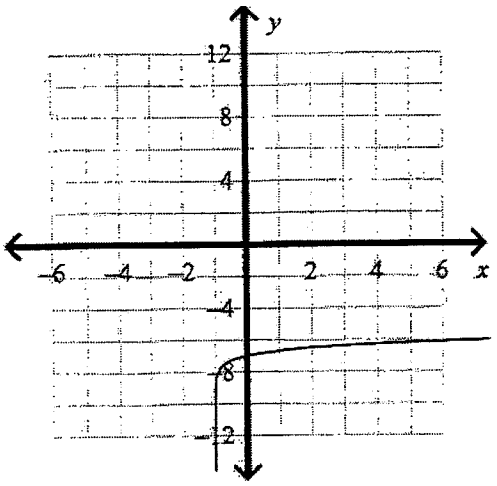
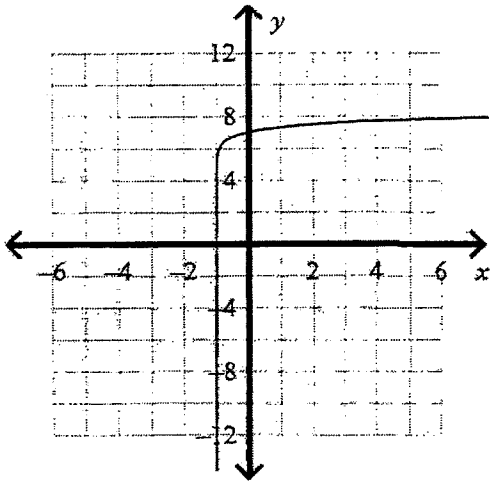
____ 10. $y = \log(x + 1) - 7$

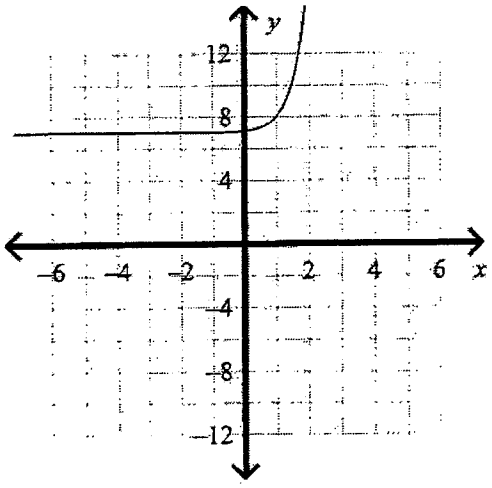
a.



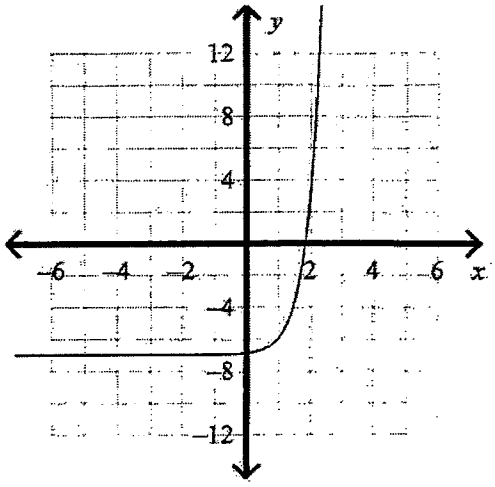
c.



b.



d.



Write the expression as a single logarithm.

____ 11. $3 \log_b q + 6 \log_b v$

a. $\log_b(q^3 v^6)$

b. $\log_b\left(q v^{3+6}\right)$

c. $(3 + 6) \log_b(q + v)$

d. $\log_b\left(q^3 + v^6\right)$

____ 12. $\log_7 50 - \log_7 5$

a. $\log 45$ b. $\log_7 45$ c. $\log_7 10$ d. $\log 10$

____ 13. $4 \log x - 6 \log (x + 2)$

a. $24 \log \frac{x}{x+2}$

b. $\log x^4 (x + 2)^6$

c. $\log x(x + 2)^{24}$

d. none of these

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Expand the logarithmic expression.

___ 14. $\log_3 \frac{d}{12}$

a. $\log_3 d - \log_3 12$
c. $\frac{\log_3 d}{\log_3 12}$
b. $-d \log_3 12$
d. $\log_3 12 - \log_3 d$

___ 15. $\log_3 11p^3$

a. $\log_3 11 \cdot 3 \log_3 p$
c. $\log_3 11 + 3 \log_3 p$
b. $\log_3 11 - 3 \log_3 p$
d. $11 \log_3 p^3$

___ 16. $\log_b \sqrt{\frac{57}{74}}$

a. $\frac{1}{2} \log_b 57 + \frac{1}{2} \log_b 74$
c. $\sqrt{\log_b 57 - \log_b 74}$
b. $\frac{1}{2} \log_b 57 - \frac{1}{2} \log_b 74$
d. $\log_b \frac{1}{2}(57 - 74)$

___ 17. A construction explosion has an intensity I of 4.85×10^{-2} W/m^2. Find the loudness of the sound in decibels if $L = 10 \log \frac{I}{I_0}$ and $I_o = 10^{-12}$ W/m^2. Round to the nearest tenth.

a. 146.9 decibels
c. 106.9 decibels
b. 115.8 decibels
d. 48.5 decibels

Solve the exponential equation.

___ 18. $\frac{1}{16} = 64^{4x-3}$

a. $\frac{1}{12}$
b. $\frac{1}{4}$
c. $\frac{7}{12}$
d. $\frac{11}{12}$

___ 19. $4^{4x} = 8$

a. $\frac{3}{4}$
b. $\frac{8}{3}$
c. $\frac{3}{8}$
d. 2

___ 20. Solve $15^{2x} = 36$. Round to the nearest ten-thousandth.

a. 0.6616
b. 2.6466
c. 1.7509
d. 1.9091

Solve the logarithmic equation. Round to the nearest ten-thousandth if necessary.

___ 21. $3 \log 2x = 4$

a. 10.7722
b. 5
c. 2.7826
d. 0.6309

___ 22. Solve $\log(4x + 10) = 3$.

a. $-\frac{7}{4}$
b. $\frac{495}{2}$
c. 250
d. 990

____ 23. $\log(x + 9) - \log x = 3$
a. 0.0090 b. 0.3103 c. 3.2222 d. 111

____ 24. $2\log 4 - \log 3 + 2\log x - 4 = 0$
a. 12.3308 b. 43.3013 c. 86.6025 d. 1875

____ 25. Solve $\log 5x + \log 14 = 1$. Round to the nearest hundredth if necessary.
a. 28 b. 0.14 c. 3.57 d. 700

Write the expression as a single natural logarithm.

____ 26. $3\ln 3 + 3\ln c$
a. $\ln(27 + c^3)$ b. $\ln 9c^3$ c. $\ln 27c$ d. $\ln 27c^3$

____ 27. $3\ln x - 2\ln c$
a. $\ln \frac{x^3}{c^2}$ b. $\ln(x^3 + c^2)$ c. $\ln(x^3 - c^2)$ d. $\ln x^3c^2$

____ 28. $3\ln a - \frac{1}{2}(\ln b + \ln c^2)$
a. $\ln \frac{3a}{0.5bc^2}$ b. $\frac{3}{2}\ln \frac{a}{bc^2}$ c. $\ln \frac{a^3}{bc}$ d. $\ln \frac{a^3}{c\sqrt{b}}$

____ 29. Simplify $\ln e^3$.
a. 3 b. $\frac{1}{3e}$ c. $3e$ d. $\frac{1}{3}$

____ 30. Solve $\ln(2x - 1) = 8$. Round to the nearest thousandth.
a. 1,489.979 b. 2,979.958 c. 2,981.458 d. 1,490.979

____ 31. Solve $\ln 2 + \ln x = 5$. Round to the nearest tenth, if necessary.
a. 50,000 b. 74.2 c. 10 d. 3

____ 32. Solve $\ln x - \ln 6 = 0$.
a. 6 b. $6e$ c. e^6 d. $\ln 6$

Use natural logarithms to solve the equation. Round to the nearest thousandth.

____ 33. $6e^{4x} - 2 = 3$
a. –0.448 b. 0.327 c. 0.067 d. –0.046

____ 34. $8e^{4x+8} = 15$
a. –0.033 b. 0.264 c. –1.843 d. 2.157

____ 35. The sales of lawn mowers t years after a particular model is introduced is given by the function $y = 5500\ln(9t + 4)$, where y is the number of mowers sold. How many mowers will be sold 4 years after a model is introduced? Round the answer to the nearest whole number.
a. 20,289 mowers c. 8,811 mowers
b. 41,709 mowers d. 19,713 mowers