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## Practice 21

## FOR USE WITH SECTION 4.2

Write each equation in logarithmic form.

1. $2^{5}=32$
2. $9^{2}=81$
3. $3^{5}=243$
4. $4^{-1 / 2}=\frac{1}{2}$
5. $7^{0}=1$
6. $4^{-3}=\frac{1}{64}$
7. $(0.5)^{3}=0.125$
8. $1000^{-1 / 3}=\frac{1}{10}$

Write each equation in exponential form.
9. $\log _{3} 81=4$
10. $\log _{1 / 2} 32=-5$
11. $\log _{5} \frac{1}{5}=-1$
12. $\log _{2} 64=6$
13. $\log _{8} 16=\frac{4}{3}$
14. $\log _{3} 1=0$
15. $\log _{0.09} 0.3=\frac{1}{2}$

Evaluate each logarithm.
17. $\log _{6} 36$
18. $\log _{27} 3$
19. $\log 0.0001$
20. $\ln e^{4}$
21. $\log _{2} \frac{1}{64}$
22. $\log _{4} 1$
23. $\log _{1.5} 2.25$
24. $\log _{81} \frac{1}{3}$
25. The atmospheric pressure (in $\mathrm{lb} / \mathrm{in} .{ }^{2}$ ) at altitude $x$ (in miles) above sea level is given by the equation

$$
y=14.7 e^{-0.198 x} .
$$

a. Find the inverse of the given function.
b. Predict the altitude at which the atmospheric pressure is $5 \mathrm{lb} / \mathrm{in} .^{2}$.
c. Find the altitude at which the atmospheric pressure is $\frac{1}{2}$ of what it is at sea level.
26. Writing Evaluate several pairs of ${\operatorname{logarithms~like~} \log _{3} 27 \text { and } \log _{27} 3 \text {, or }}_{\text {a }}$ $\log _{4} 8$ and $\log _{8} 4$. Describe any pattern that you notice. Make a conjecture about the relationship between $\log _{a} b$ and $\log _{b} a$, where $a$ and $b$ are positive numbers and neither is equal to 1 .

