Name: **Date:**

Practice: Logarithmic Functions as Inverses A

For problems 1–3, write the inverse of each logarithmic function.

1. $f(x) = 2 \bullet \log_{10}(x + 1) - 3$

2. $g(x) = \dfrac{2 \bullet \log_3 x + 4}{\log_3 x - 5}$

3. $h(x) = 0.25 \bullet \log_5 x^{-0.25}$

For problems 4–7, state the domain and range of the logarithmic function.

4. $a(x) = 4 - \log_6(x - 6)$

5. $b(x) = \dfrac{9}{\log_6 3x}$

6. $c(x) = \log_7(2 - x) + 7$

7. $d(x) = \dfrac{1}{4} \bullet \log_3(2x - 1)$

continued

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Use the information given in each scenario to complete problems 8–10.

8. The intensity of a particular sound is 10^{-8} watt per meter squared. The intensity of a second type of sound is 10^{-4} watt per meter squared. The decibel loudness of a sound is given by the function $D(i) = \log_{10}\left(\frac{i}{i_0}\right)$, in which $i_0 = 10^{-12}$ watt per meter squared, the threshold of human hearing. How much greater is the *loudness* (in decibels) of the second sound than the first? How much greater is the *intensity* of the second sound than the first?

9. In order to change their electrical properties, semiconductors are heated in a process called furnace annealing. The pH of an acid bath used to treat a semiconductor after it emerges from an annealing furnace is supposed to be 3.5. However, the pH can cover a range of 3.45 to 3.55 without the semiconductor being rejected. The pH is given by the formula $\text{pH} = -\log_{10} C$, where C is the concentration of the acid bath. Find the range of concentrations of the acid bath within which the semiconductor treatment is acceptable.

10. The chance of rolling a 6 on a fair number cube with faces numbered 1–6 is 1 out of 6, and the chance of rolling a 6 twice in a row is 1 out of 36. What is the chance, $C(n)$, of rolling a 6 ten times in a row? Write an exponential function for the chance $C(n)$ of rolling a 6 n times in a row. Write the inverse $C^{-1}(n)$ using a logarithm.