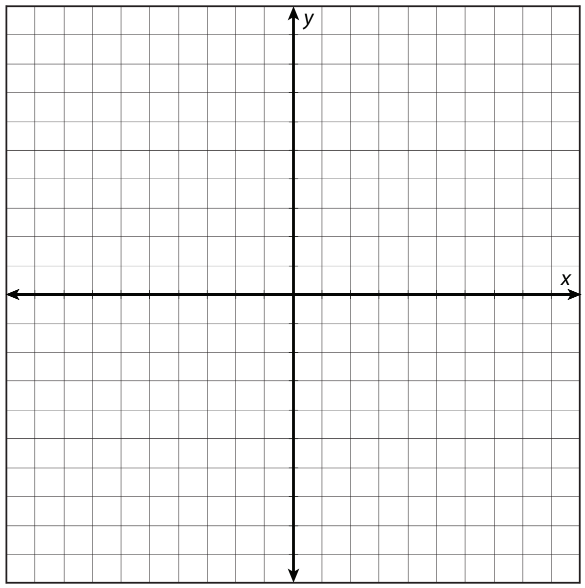
Name: Date:

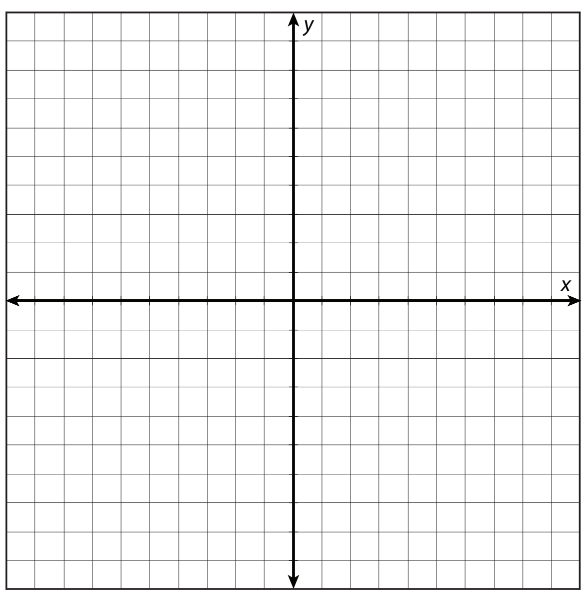
Practice: Graphing Logarithmic Functions B

For problems 1–4, sketch $f(x)$ and $g(x)$. Then, calculate the solution to the system of the two functions.

1. $f(x) = -4 + 3 \bullet \log_2 x$
   $g(x) = 3 - 4 \bullet \log_2 x$



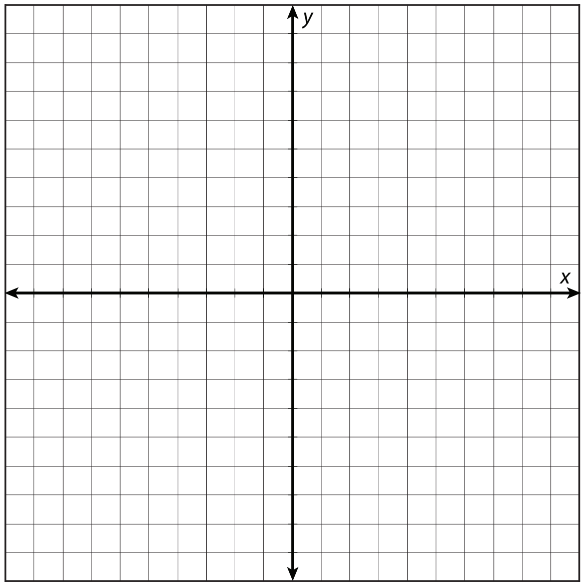
2. $f(x) = \log(1 - x)$
   $g(x) = \log(x - 1)$



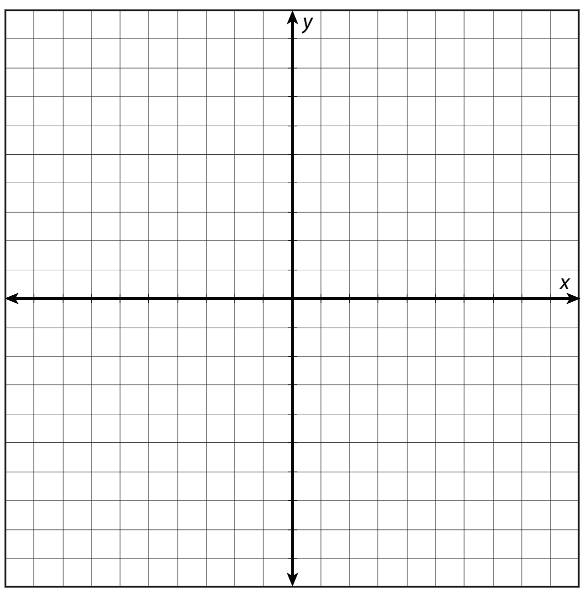
continued

Name: **Date:**

3. $f(x) = 2 \bullet \ln(x + 2)$
   $g(x) = \ln(x - 2)$



4. $f(x) = 5 \bullet \log_5 x$
   $g(x) = \log_5(x - 5)$



continued

Name: Date:

For problems 5–7, compare the domains and ranges of the three functions in each problem. Then, state the domain(s) over which all three functions are defined.

5. $f(x) = 1 + \log x$
   $g(x) = \log x - 2$
   $h(x) = 1 + 2 \bullet \log x$

6. $f(x) = 3 \bullet \ln (x + 1)$
   $g(x) = -2 \bullet \ln (1 - x)$
   $h(x) = \ln (x - 1)$

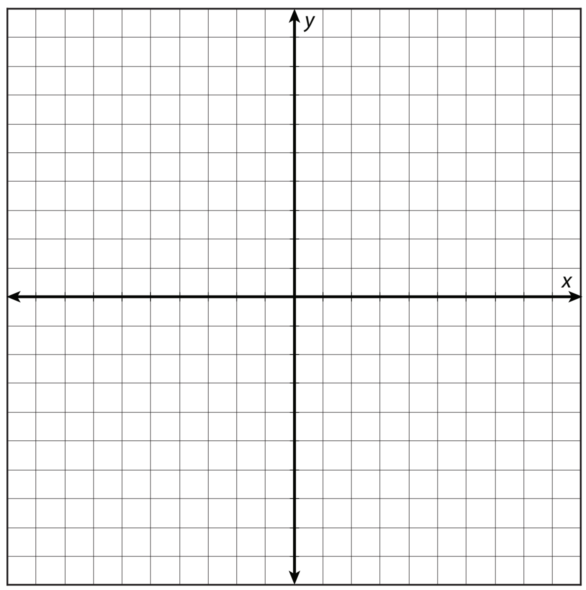
7. $f(x) = 1 - 3 \bullet \log_3 (x - 3)$
   $g(x) = 3 - \log_3 (x - 1)$
   $h(x) = -1 + 3 \bullet \log_3 (x + 3)$

continued

Name: **Date:**

For problems 8–10, use the information in each problem to sketch a graph of the given function on a coordinate plane. Be sure to label the axes so that all the real-world parts of the domain and range are evident. Then, use your graph to solve the problem.

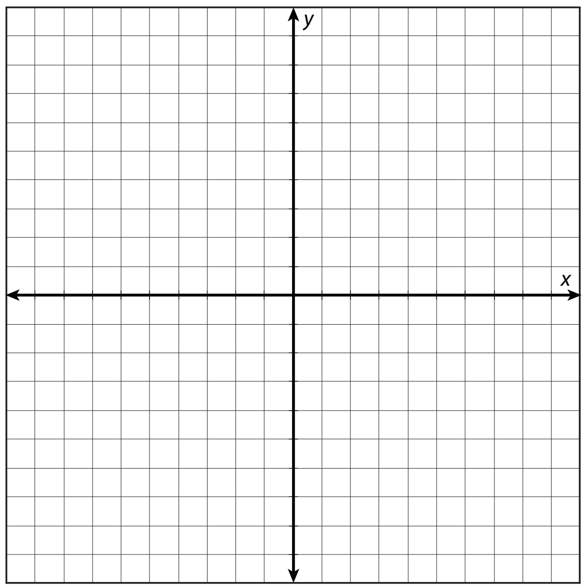
8. A bacterium that is useful in digesting food is found to have a gene that can mutate, resulting in the bacterium's resistance to drugs that treat food poisoning. A researcher found that the number of instances of drug-resistant bacteria populations in a laboratory study can be modeled by the logarithmic function $N(i) = 90 - 65 \bullet \ln i$, where N is the number of instances of food poisoning and i is the number of drug-resistant bacteria populations found in each instance. Describe any conditions placed on the kinds of numbers that can be used for the domain and range. Let the domain be [1, 4] and the range be [0, 90].



continued

Name: **Date:**

9. The management team at a factory that makes smartphone cases has found that the number of defective cases produced can be described by the logarithmic function $D(n) = -80 + 12 \bullet \ln n$, where n is the number of cases produced in a production run and D is the number of defective units produced. The domain of n in a one-time study of the defective units is [1,000, 30,000]. What happens to the *rate* of defective cases produced per 1,000 cases as the size of the production run increases across the domain? Compare two pairs of sequential defective-case numbers to support your answer.



10. A food chemist at a state university studied the effect of pumping extra carbon dioxide into greenhouses where pepper plants grow. She found that the number of peppers produced by these plants can be modeled by the exponential function $N(c) = 20c \bullet e^{-0.4c}$, where N is the number of full-grown peppers and c is the concentration of carbon dioxide. Write a logarithmic function from the exponential function and explain the domain and range of the logarithmic function.