4.3 WS 3

Write each equation in its exponential form.

1. $\frac{1}{2} = \log_{25} 5$

2. $\log 10 = 1$

3. $3 = \log_{\frac{3}{2}} \frac{27}{8}$

4. $\log_7 (x-2) = 3$

Write each equation in its logarithmic form. Assume $y > 0$ and $b > 0$.

5. $e^2 = 7.389$

6. $16^{\frac{1}{2}} = 4$

7. $5^3 = 125$

8. $x^2 + 3 = e^4$

Evaluate each logarithmic expression. Do not use a calculator.
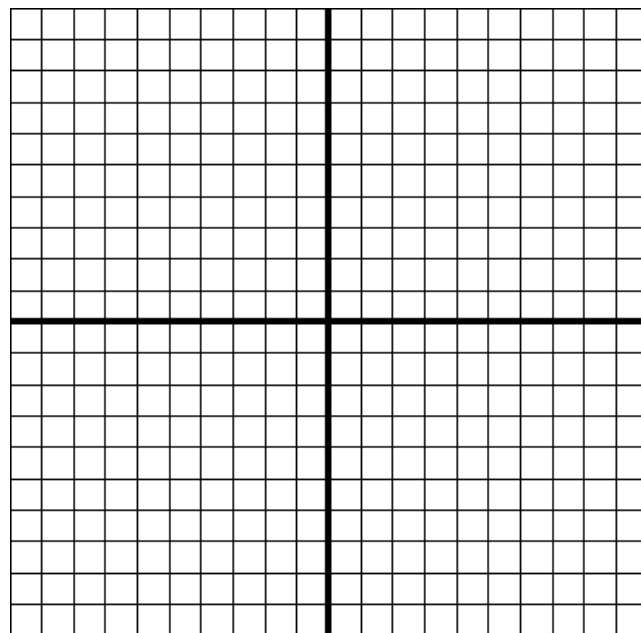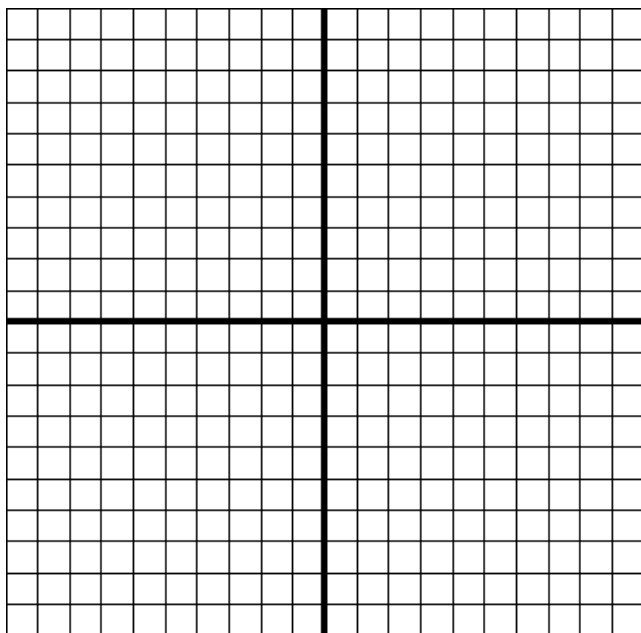
9. $\log_8 512$

10. $\log_{13} 1$

11. $-6\log_{\frac{1}{4}} 64$

12. $7\left(6^{\log_6 81}\right)$

Graph each function by using it exponential form.

13. $f(x) = \log_3 x$

14. $f(x) = \log_{\frac{1}{5}} x$

Find the domain of the function.

15. $k(x) = \log_{15}(x^2 - 8x + 15)$ 16. $f(x) = \log(x^2 - 4)$ 17. $h(x) = \log_2(x - 2)$ 18. $g(x) = \log_7\left(\dfrac{1}{x+10}\right)$

Explain how to use the graph of the first function to produce the graph of the second function.

19. $f(x) = \log_4 x;\ f(x) = \log_4 x + 5$

20. $f(x) = \log_8 x;\ f(x) = \log_8(x - 1) - 4$

21. $f(x) = \log_{2/3} x;\ f(x) = \log_{2/3}(x + 6)$

22. The function $N(x) = 2750 + 180\ln\left(\dfrac{x}{1000} + 1\right)$ models the relationship between the dollar amount x spent on advertising a product and the number of units N that a company can sell.

    a. Find the number of units that will be sold with advertising expenditures of $20,000, $40,000, and $60,000.

    b. How many units will be sold if the company does not pay to advertise the product?