Chapter 4 Review 2

Use the composition of functions to determine whether the given functions are inverse functions.

1. $F(x)=\sqrt{x}$ $G(x)=x^2$

2. $p(x)=\dfrac{x+3}{x}$ $q(x)=\dfrac{3}{x-1}$

Find the inverse of each function.

3. $f(x)=-2x+3$

4. $f(x)=\dfrac{x}{x+4}$

5. $\{(3,-1),(-5,-17),(0,-7),(4,1),(7,7)\}$

6. $f(x)=\sqrt{5x-4}$

Solve each equation.

7. $\log_3 81 = x$ 8. $\ln e^{\pi} = x$ 9. $5^{x-4} = 625$ 10. $32\left(2^x\right) = 1024$ 11. $10^{\log 2x} = 14$

Write each equation in its exponential form.

12. $3 = \log_3 27$ 13. $-1 = \log \frac{1}{10}$ 14. $\ln x = 7$ 15. $\log_4 (x+2) = 5$

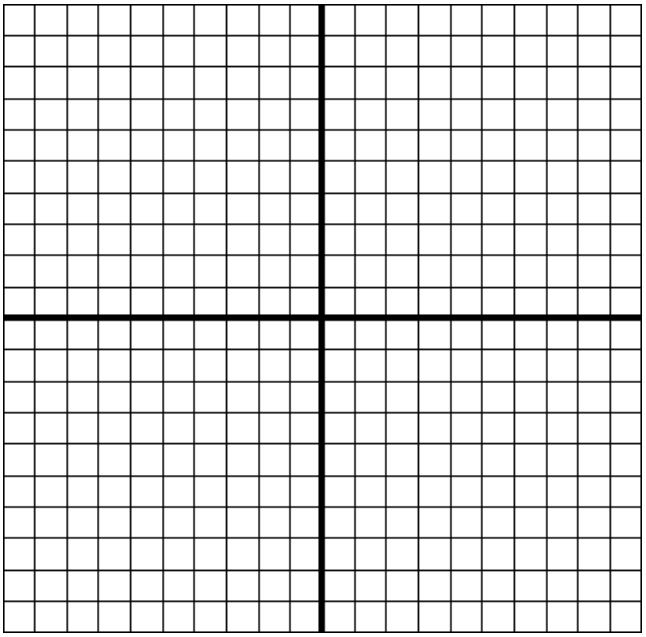
Write each equation in its logarithmic form. Assume $y > 0$ and $b > 0$.

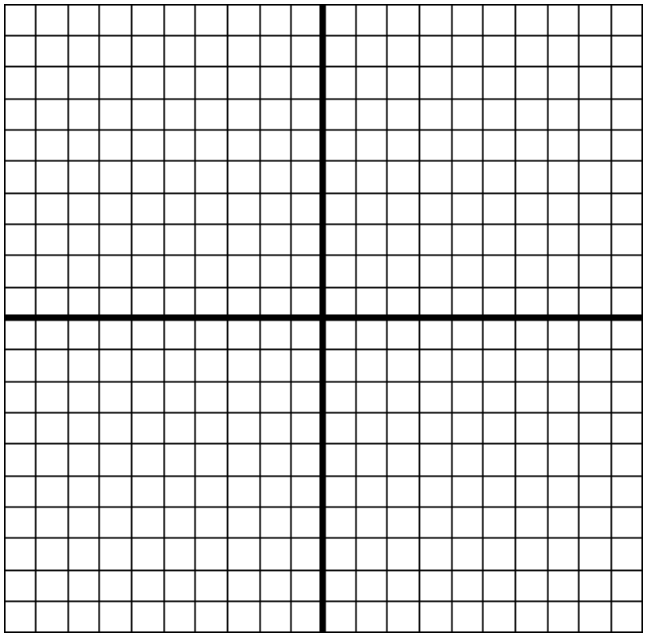
16. $2^6 = 64$ 17. $4^{1/2} = 2$ 18. $90.02 = e^{4.5}$ 19. $e^{\sqrt{2}} = (x-10)$

Graph each function.

20. $f(x) = \left(\frac{1}{3}\right)^x$

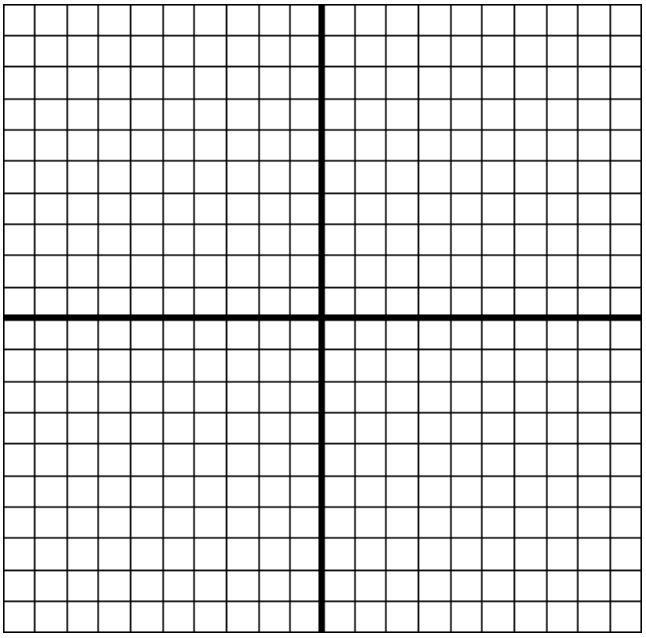
21. $f(x) = 2^x$

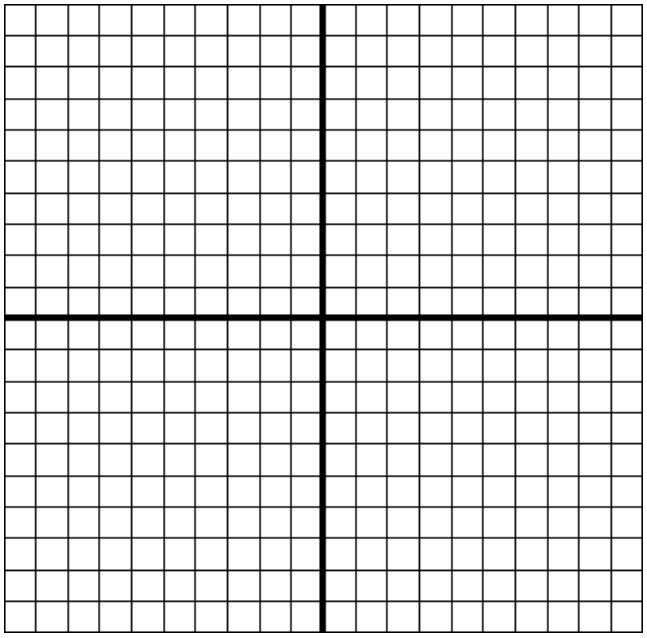




22. $f(x) = \log_7 x$

23. $f(x) \log_{1/6} x$





Expand the logarithmic expressions.

24. $\log\left(x^3 y\sqrt{z}\right)$

25. $\ln\left(\dfrac{\sqrt{xy^3}}{ez^2}\right)$

26. $\log_2\left(\dfrac{8x}{\sqrt[3]{y^2}}\right)$

Write each logarithmic expression as a single logarithm with a coefficient of 1.

27. $5\log x - 2\log(x+5)$

28. $\ln x - (\ln y - \ln z)$

29. $\dfrac{1}{2}\log_2(xy) + 3\log_2 z - \log_2 a$

Use the change-of-base formula and a calculator to approximate each logarithm accurate to six significant digits.

30. $\log_5 8$

31. $\log_9 121$

32. $\log_6 5.91$

33. $\log_8 \pi$

Solve the equation for *x*.

34. $7^x = 54$

35. $\log 75x + \log(x+1) = 2$

36. $\ln x + \ln(x+5) = \ln 403.428$

37. $4^{3x+11} = 89$

38. Use $pH = -\log\left[H^+\right]$ to find the hydronium-ion concentration of lemon juice that has a pH of 2.3.

39. Find the balance when $3750 is invested at an annual interest rate of 2.5% for 5 years is compounded
    a. Monthly
    b. Daily
    c. Continuously

40. Use the exponential growth function $N(t) = N_0 e^{kt}$ to answer the both **a** and **b**.
    a. Find the exponential growth function for a city whose population was 25,500 in 2007 and 26,800 in 2008. Use $t = 0$ to represent 2007.
    b. Use the growth function to predict, to the nearest hundred, the population of the city in 2014.