

Chapter 4 Review 3

KEY

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

1. $f(x) = \frac{2}{3}x + 4$ $g(x) = \frac{3}{2}x - 6$

yes

2. $p(x) = \frac{x-1}{x}$ $q(x) = \frac{x}{x-1}$

No

Find the inverse of each function.

3. $f(x) = \frac{1}{4}x + 5$

$f^{-1}(x) = 4x - 20$

4. $f(x) = \frac{x}{x-3}$

$f^{-1}(x) = \frac{-3x}{1-x}$

5. $f(x) = \sqrt{2x-3}$

$f^{-1}(x) = \frac{x^2+3}{2}$

6. $\{(-3,10), (-1,2), (0,1), (4,17)\}$

$\{(10,-3), (2,-1), (1,0), (17,4)\}$

Solve each equation.

7. $\log_7 343 = x$

$x = 3$

8. $5(3^x) = 10935$

$x = 7$

9. $10^{\log_{10} 2x} = 72$

$x = 6$

10. $\ln(x+7) = 2$

$x = 0.39$

11. $8^{x+12} = 4096$

$x = -8$

Write each equation in its exponential form.

12. $4 = \log_2 16$

$2^4 = 16$

13. $-3 = \log_{10} \frac{1}{1000}$

$10^{-3} = \frac{1}{1000}$

14. $\log_6(x-3) = 2$

$6^2 = x - 3$

15. $\ln x = 5$

$e^5 = x$

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

16. $5^3 = 125$

$\log_5 125 = 3$

17. $9.97 = e^{2.3}$

$\ln 9.97 = 2.3$

18. $27^{1/3} = 3$

$\log_{27} 3 = \frac{1}{3}$

19. $10^{4.8} = (x+7)$

$\log(x+7) = 4.8$

Expand the logarithmic expressions.

20. $\log(x\sqrt[3]{y^3z})$

$\log x + \frac{3}{5} \log y + \frac{1}{2} \log z$

21. $\log_4 \left(\frac{(xz)^3}{64y^{1/2}} \right)$

$3 \log_4 x + 3 \log_4 z - \left[3 + \frac{1}{2} \log_4 y \right]$

22. $\ln \left(\frac{x^2y}{\sqrt[3]{ez^2}} \right)$

$2 \ln x + \ln y - \left[\frac{1}{3} + \frac{2}{3} \ln z \right]$

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

$$23. \log x + \frac{1}{2} \log y - [\log 3 + \log z]$$

$$\log \left(\frac{x\sqrt{y}}{3z} \right)$$

$$24. 2 \ln x - \left(\ln x - \frac{1}{2} \ln yz \right)$$

$$\ln \left(\frac{x^2}{\frac{x}{\sqrt{yz}}} \right) = \ln \left(x^2 \left(\frac{\sqrt{yz}}{x} \right) \right)$$

$$\boxed{\ln(x\sqrt{yz})}$$

$$25. \frac{2}{3} \log_5(xy) + \log_5 z - 2 \log_5 x$$

$$\log_5 \left(\frac{z \sqrt[3]{(xy)^2}}{x^2} \right)$$

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

$$26. \log_2 9$$

$$3.169925$$

$$27. \log_3 42$$

$$3.402174$$

$$28. \log_7 6.13$$

$$0.931798$$

$$29. \log_4 \pi$$

$$0.825748$$

Solve the equation for x .

$$30. 8^{4x-7} = 124$$

$$x = 2.33$$

$$31. \log_2 2x + \log_2 x = 5$$

$$x = 4$$

$$32. 2 \log_2 x - \log_2 6 = 2$$

$$x = 4.899$$

$$33. \log(7x) + 4 = 5$$

$$x = \frac{10}{7}$$

34. Find the balance when \$1200 is invested at an annual interest rate of 7.5% for 8 years is compounded

a. Monthly

$$a. \$2182.46$$

b. Weekly

$$b. \$2185.60$$

c. Continuously

$$c. \$2186.54$$