

# Test 1 Review

# Key

$$1. \log_5 \left( \frac{u}{v^4} \right)^6 = \log_5 \frac{u^6}{v^{24}} = 6 \log_5 u - 24 \log_5 v$$

$$2. \log_6 \left( \frac{u}{v^3} \right)^6 = \log_6 \frac{u^6}{v^{18}} = 6 \log_6 u - 18 \log_6 v$$

$$3. \log (a^2 \cdot b)^6 = \log a^{12} b^6 = 12 \log a + 6 \log b$$

$$4. \log_4 (a b^6)^3 = \log_4 a^3 b^{18} = 3 \log_4 a + 18 \log_4 b$$

$$5. X = \log_{\frac{1}{2}} (y-1) + 8$$

$$X - 8 = \log_{\frac{1}{2}} (y-1)$$

$$\frac{1}{2}^{(X-8)} = y-1$$

$$y = \left( \frac{1}{2} \right)^{(X-8)} + 1$$

$$6. X = \log_2 y^4 - 3$$

$$X + 3 = \log_2 y^4$$

$$2^{X+3} = y^4$$

$$\left( 2^{X+3} \right)^{\frac{1}{4}} = y$$

$$7. X = \log_3 4^Y - 10$$

$$X + 10 = \log_3 4^Y$$

$$3^{X+10} = 4^Y$$

$$\log_4 3^{X+10} = Y$$

$$8. X = \ln(-4y-7)$$

$$e^X = -4y-7$$

$$\frac{e^{X+7}}{-4} = y$$

$$9. X = \log_3 \frac{5^Y}{-2}$$

$$3^X = \frac{5^Y}{-2}$$

$$-2 \cdot 3^X = 5^Y$$

$$\log_5 (-2 \cdot 3^X) = Y$$

$$10. X = \frac{2^Y - 1}{-4}$$

$$-4X = 2^Y - 1$$

$$-4X + 1 = 2^Y$$

$$\log_2 (-4X + 1) = Y$$

$$12. X = \left( \frac{5^Y}{4} \right)^{\frac{1}{5}}$$

$$X^5 = \frac{5^Y}{4}$$

$$4X^5 = 5^Y$$

$$\log_5 4X^5 = Y$$

$$11. X = (3^Y - 2)^{\frac{1}{4}}$$

$$X^4 = 3^Y - 2$$

$$X^4 + 2 = 3^Y$$

$$\log_3 (X^4 + 2) = Y$$

$$13. \log_5 x - \log_5 (x-4) = 3$$

$$\log_5 \frac{x}{x-4} = 3$$

$$\frac{x}{x-4} = 125$$

$$x = 125x - 500$$

$$500 = 124x$$

$$\frac{500}{124} = x = \frac{125}{31}$$

$$14. \log_7 x - \log_7 (x+6) = 2$$

$$\log_7 \frac{x}{x+6} = 2$$

$$\frac{x}{x+6} = 49$$

$$x = 49x + 294$$

$$-294 = 48x$$

$$\frac{-294}{48} = x = \frac{-147}{12}$$

$$15. \log_9 (x+46) + \log_9 x = \log_9 47$$

$$\log_9 x(x+46) = \log_9 47$$

$$x^2 + 46x - 47 = 0$$

$$(x+47)(x-1) = 0$$

$$x = 1$$

$$16. \log_2 (x+5) - \log_2 x = 5$$

$$\log_2 \frac{x+5}{x} = 5$$

$$\frac{x+5}{x} = 32$$

$$x+5 = 32x$$

$$5 = 31x$$

$$\frac{5}{31} = x$$

$$17. \log_2 u + 3\log_2 v + 5\log_2 w$$

$$\log_2 \frac{uv^3w^5}{1}$$

$$18. \ln c + 3\ln a - 3\ln b$$

$$= \ln \frac{ca^3}{b^3}$$

$$19. 12\log_9 z = 12\log_9 x - 6\log_9 y$$

$$= \log_9 \frac{x^{12} z^{12}}{y^6}$$

$$20. \log_3 10 + 2\log_3 11 + \frac{1}{3}\log_8 7$$

$$\log 1210 \sqrt[3]{7}$$

$$21. x = -\frac{2}{5}y^{-2}$$

$$x+2 = -\frac{2}{5}y$$

$$-\frac{5}{2}(x+2) = y$$

$$22. x = y^3$$

$$x^{\frac{1}{3}} = y$$

$$23. x = 5 - \frac{9}{2}y$$

$$x-5 = -\frac{9}{2}y$$

$$-\frac{2}{9}(x-5) = y$$

$$24.$$

$$x = (y-1)^3$$

$$x^{\frac{1}{3}} = y-1$$

$$x^{\frac{1}{3}} + 1 = y$$

$$25. \quad 12^y = x \\ \log_{12} x = y$$

$$26. \quad 9^p = 193 \\ \log_9 193 = p$$

$$27. \quad a^b = 73 \\ \log_a 73 = b$$

$$28. \quad 17^n = m \\ \log_{17} m = n$$

$$29. \quad \log_y x = 5 \\ y^5 = x$$

$$30. \quad \log_y x = 2 \\ y^2 = x$$

$$31. \quad \log_{15} x = y \\ 15^y = x$$

$$32. \quad \log_{12} m = -4 \\ 12^{-4} = m$$

$$f(x) = 2(x+5)^3 - 3$$

$$f'(x) = \left(\frac{x+3}{2}\right)^{\frac{1}{3}} - 5$$

$$D(-\infty, \infty), \quad R(-\infty, \infty)$$

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