

Solving Logarithms & Exponential Equations

Solve each equation. Exact answers only.

1. $\left(\frac{1}{6}\right)^{-3v} = 216^{3v}$

$$v = 0$$

2. $\left(\frac{1}{4}\right)^{2b} = 64$

$$b = -\frac{3}{2}$$

3. $125^{1-p} = 625$

$$p = -\frac{1}{3}$$

4. $\left(\frac{1}{9}\right)^{2-2x} = 27$

$$x = \frac{7}{4}$$

5. $\frac{625^{-3x}}{\left(\frac{1}{5}\right)^{2x+1}} = 5^3$

$$x = -\frac{1}{5}$$

6. $25^{2-n} \cdot 125^{-3n+2} = 125$

$$n = \frac{7}{11}$$

Solve each equation. Round to three decimal places.

7. $-4.5 \cdot 11^{-10n} = -94$

$$n = -0.127$$

8. $6^{k-2} = 11^{-2k+1}$

$$k = 0.908$$

9. $-2 \cdot 6^{2n+5} = -99$

$$n = -1.411$$

10. $14^{9m-2} + 4 = 39$

$$m = 0.372$$

11. $-8 \cdot 11^{-2b} + 7 = -80$

$$b = -0.498$$

12. $6 \cdot 9^{-3k} + 10 = 75.5$

$$k = -0.3626$$

$$13. \log_8(-3x + 10) = \log_8(5x - 9)$$

$$-8x = -19$$

$$x = 19/8$$

$$= 2.375$$

$$14. \log_{17}(-4x - 1) = \log_{17}(-3x + 4)$$

$$x = -5$$

$$15. \log_{14}(n^2 + 7n) = \log_{14}(7 + n)$$

$$x = 1$$

$$16. \log_8(12p - 2) = \log_8(p^2 + 18)$$

$$p = 10, 2$$

$$17. \log x - \log(x - 2) = 1$$

$$x = \frac{20}{9} = 2.222$$

$$18. \log_3(x - 6) - \log_3 x = \log_3 12$$

$$\emptyset$$

$$19. \log_9 10 - \log_9 5x = 2$$

$$\cancel{9x} \quad 9^2 = \frac{10}{5x}$$

$$405x = 10$$

$$x = 2/81$$

$$20. \log_9 x + \log_9(x + 11) = \log_9 42$$

$$x = 3$$

$$21. \log_5 x + \log_5(x + 4) = 1$$

$$1$$

$$22. \log_9 2 + \log_9(x^2 + 6) = \log_9 61$$

$$x = \pm \frac{7\sqrt{2}}{2}$$