

# 4.5 WS 3

---

Solve the following equations. Be sure to check your answers.

1.  $8^t = -6$

2.  $12 = \log(4t)$

3.  $17 = 3^x$

4.  $-1 = \log(x+3)$

$$\begin{aligned} 5. \quad 4 &= 15 - e^{x-8} \\ \frac{-15}{-1} - \frac{-15}{-1} & \\ \frac{-11}{-1} &= \frac{-e^{x-8}}{-1} \\ 11 &= e^{x-8} \\ \ln 11 &= (x-8) \ln e \\ +8 & \quad +8 \\ \hline x &= 8 + \ln 11 \\ \boxed{x} &= \boxed{10.4} \end{aligned}$$

6.  $\log(x+3) = \frac{1}{2}$

7.  $29 + 10^{t+12} = 74$

$$\begin{aligned} 8. \quad 1 &= \log_4 2 + \log_4(3+x) \\ 1 &= \log_4 (2(3+x)) \\ 1 &= \log_4 (6+2x) \\ 4^1 &= 6+2x \\ -6 & \quad -6 \\ \hline -2 &= \frac{2x}{2} \\ x &= -1 \end{aligned}$$

9.  $\log(t+3) + \log(t) = 1$

$$10. \log_2(t+1) + \log_2(t-1) = 5$$

$$\log_2(t^2 - 1) = 5$$

$$2^5 = t^2 - 1$$

$$32 = t^2 - 1$$

$$\sqrt{33} = \sqrt{t^2}$$

$$t = \pm \sqrt{33}$$

$$t = \sqrt{33}$$

$$11. \log_3(4t) = 1 - \log_3(3t) + \log_3(3t) + \log_3(3t)$$

$$\log_3(12t^2) = 1$$

$$\frac{3^1}{12} = \frac{12t^2}{12}$$

$$\sqrt{\frac{1}{4}} = \sqrt{t^2}$$

$$t = \pm \frac{1}{2}$$

$$t = \frac{1}{2}$$

$$12. e^{2x} - e^x - 6 = 0$$

$$u = e^x$$

$$u^2 - u - 6 = 0$$

$$-3 \quad 2$$

$$u = 3$$

$$u = -2$$

$$e^x = 3$$

$$e^x = -2$$

$$x = \ln 3$$

$$x = \ln -2$$

$$x = \ln 3$$

$$x = 1.1$$

Write each equation in its exponential form.

$$13. 3 = \log_3 27$$

$$14. 4 = \log_{10} 10,000$$

$$15. \ln x = 5$$

$$16. \log_5(x+1) = 3$$

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

$$17. 2^4 = 16$$

$$18. 4^3 = 64$$

$$19. 54.60 = e^4$$

$$20. e^6 = (x+3)$$

Find the domain of the function.

$$21. f(x) = \log_2(11-x)$$

$$22. f(x) = \log(x^2 + 7x + 10)$$

$$23. f(x) = \log_3 x$$

$$24. f(x) = \log\left(\frac{4}{x+2}\right)$$