

11.6

SM3 Solving Logarithmic Equations 2018-19

Name _____ Date _____ Period _____

Find the exact solution algebraically, and check it by substituting into the original equation. Show work!

1. $32\left(\frac{1}{4}\right)^{x/3} = 2$

2. $2 \cdot 5^{x/4} = 250$

3. $3(5^{-x/4}) = 15$

4. $\log_2 x = 5$

5. $\log x = 3$

6. $\log_4(x-5) = -1$

Solve each equation. If necessary, obtain a numerical approximation for your solution by rounding to the nearest ten thousandths. Check your solution by substituting into the original equation. Show work!

7. $1.08^x = 6.45$

8. $0.95^x = 1.3$

9. $40e^{0.025x} = 200$

10. $3 + 2e^{-x} = 11$

11. $7 - 4e^{-x} = -5$

12. $4e^{(x+1)} = 5$

$$13. 3^x = 25$$

$$14. 5^{x+3} = 30$$

$$15. 4^{5-x} - 2 = 13$$

$$16. 9^{(x-4)} + 2 = 5$$

$$17. \ln x^2 = 6$$

$$18. \log x^2 = 4$$

$$19. \log_3(x+2) = 2$$

$$20. 3\ln(x-2) + 6 = 7$$

$$21. 3 - \log(x+3) = 4$$

$$22. \log_3 x = \log_3 7$$

$$23. \log_5 x = \log_5(2x - 3)$$

$$24. \log_3(3x - 2) = 3$$

$$25. \log_2(x+2) + \log_2(x+4) = 3$$

$$26. \log_{10} x + \log_{10}(x + 21) = 2$$

$$27. \log_3(5x + 5) - \log_3(x^2 - 1) = 0$$

$$28. 2\log_3(x+4) - \log_3 9 = 2$$

$$29. 5\log_3(x + 1) - \log_3 27 = 2$$

$$30. 3\log_2(x - 4) + \log_2 32 = 17$$

$$31. \log_9 5 + \log_9(n + 1) = \log_9 6n$$

$$32. \log_3 2 + \log_3 8 = \log_3 2x$$

$$33. \log_5 42 - \log_5 7 = \log_5(3x - 1)$$

34. The value of a Honda Civic DX that is t years old can be modeled **by** $V(t) = 16,775(0.905)^t$.

According to the model, when will the car be worth \$15,000? \$8,000? \$4,000? Show work!

Review: Solve the given equations. Show all work!

$$35. x^2 - 7x - 30 = 0$$

$$36. x^2 - 4x + 3 = 0$$