

Math 3 Unit 9 Worksheet 3
Solving and Evaluating Exponential &
Logarithmic Equations with Common Bases

Name: _____
Date: _____ Per: _____

Solve for x .

1. $9^x = \frac{1}{27}$

2. $8^{2+x} = 2$

3. $4^{1-x} = 8$

4. $27^{2x-1} = 3$

5. $4^{3x+5} = 16^{x+1}$

6. $3^{-(x+5)} = 9^{4x}$

7. $25^{2x} = 5^{x+6}$

8. $6^{x+1} = 36^{x-1}$

9. $10^{x-1} = 100^{4-x}$

10. $5^x = \sqrt{125}$

11. $6^x = 36\sqrt{6}$

12. $49^{x-2} = 7\sqrt{7}$

Evaluate each logarithm.

13. $\log_6 6\sqrt{6}$

14. $\log_5 125\sqrt{5}$

15. $\log_4 \sqrt{2}$

16. $\log_{27} \sqrt{3}$

17. $\log_7 \sqrt[3]{49}$

18. $\log_3 \sqrt[5]{9}$

19. $\log_{\frac{1}{2}} 8$

20. $\log_{\frac{1}{3}} 81$

21. $\log_2 \sqrt[3]{\frac{1}{4}}$

22. $\log \frac{1}{\sqrt{1000}}$

23. $\log_8 \sqrt[3]{4}$

24. $\ln \frac{1}{\sqrt[3]{e^2}}$

Solve for x .

25. $\log_2 7x = \log_2 77$

26. $\log_6 \frac{x}{4} = \log_6 5$

27. $\log_3 2^x = \log_3 16$

28. $\log_5(2x + 12) = \log_5(3x + 4)$

29. $\log_8 3^{2x} = \log_8 81$

30. $\log 5^{4x} = \log 125$

31. $\ln 4^x = \ln 32$

32. $\log x^{\frac{5}{3}} = \log 32$

33. $\log_{\pi} x = 3$

34. $\log_{64} 32 = x$

35. $\log_5(2x - 7) = 0$

36. $\log(3x + 1) = 2$

37. $\ln x = 2$

38. $\log \sqrt[3]{100} = x$

39. $\ln(x - 9) = 1$

40. $\log_x 27 = \frac{3}{4}$