

Do all work on your paper or in notebook!

1. **VOCABULARY** Copy and complete: The equation $5^x = 8$ is an example of a(n) ? equation.

2. **WRITING** When do logarithmic equations have extraneous solutions?

SOLVING EXPONENTIAL EQUATIONS Solve the equation.

3. $5^{x-4} = 25^{x-6}$

4. $7^{3x+4} = 49^{2x+1}$

5. $8^{x-1} = 32^{3x-2}$

6. $27^{4x-1} = 9^{3x+8}$

7. $4^{2x-5} = 64^{3x}$

8. $3^{8x-7} = 81^{12-3x}$

9. $36^{5x+2} = \left(\frac{1}{6}\right)^{11-x}$

10. $10^{3x-10} = \left(\frac{1}{100}\right)^{6x-1}$

11. $25^{10x+8} = \left(\frac{1}{125}\right)^{4-2x}$

SOLVING EXPONENTIAL EQUATIONS Solve the equation.

12. $8^x = 20$

13. $e^{-x} = 5$

14. $7^{3x} = 18$

15. $11^{5x} = 33$

16. $7^{6x} = 12$

17. $4e^{-2x} = 17$

18. $10^{3x} + 4 = 9$

19. $-3e^{2x} + 16 = 5$

20. $0.5^x - 0.25 = 4$

21. $\frac{1}{3}(6)^{-4x} + 1 = 6$

22. $2^{0.1x} - 5 = 7$

23. $\frac{3}{4}e^{2x} + \frac{7}{2} = 4$

SOLVING LOGARITHMIC EQUATIONS Solve the equation. Check for extraneous solutions.

24. $\log_5(5x+9) = \log_5 6x$

25. $\ln(4x-7) = \ln(x+11)$

26. $\ln(x+19) = \ln(7x-8)$

27. $\log_5(2x-7) = \log_5(3x-9)$

28. $\log(12x-11) = \log(3x+13)$

29. $\log_3(18x+7) = \log_3(3x+38)$

30. $\log_6(3x-10) = \log_6(14-5x)$

31. $\log_8(5-12x) = \log_8(6x-1)$

EXPONENTIATING TO SOLVE EQUATIONS Solve the equation. Check for extraneous solutions.

32. $\log_4 x = -1$

33. $5 \ln x = 35$

34. $\frac{1}{3} \log_5 12x = 2$

35. $5.2 \log_4 2x = 16$

36. $\log_2(x-4) = 6$

37. $\log_2 x + \log_2(x-2) = 3$

38. $\log_4(-x) + \log_4(x+10) = 2$

39. $\ln(x+3) + \ln x = 1$

40. $4 \ln(-x) + 3 = 21$

41. $\log_5(x+4) + \log_5(x+1) = 2$

42. $\log_6 3x + \log_6(x-1) = 3$

43. $\log_3(x-9) + \log_3(x-3) = 2$

Solving Log EQs w/Properties

Solve each equation.

1) $\log_5 4 + \log_5 x^2 = 2$

2) $\log_9 x + \log_9 6 = \log_9 25$

3) $\log_2 6 + \log_2 x = 1$

4) $\log_9 2x^2 + \log_9 2 = 1$

5) $\log_4 10 - \log_4 (x + 9) = \log_4 2$

6) $\log_3 (x^2 + 2) - \log_3 2 = 1$

7) $\log_5 (6 - 5x^2) + \log_5 8 = \log_5 38$

8) $\log_3 (5x - 7) + \log_3 2 = 4$