

More 7.6 Solving Log Equations

Property of Equality for Log Equations:

If b , x and y are positive, $b \neq 1$

then $\log_b x = \log_b y$ if and only if $x = y$

Example: $\log_2 x = \log_2 7$

$$x = 7$$

Example: $\log_4(2x + 8) = \log_4(6x - 12)$

$$2x + 8 = 6x - 12$$

$$20 = 4x$$

$$5 = x$$

Example: $\log_7(3x - 2) = 2$

$$7^2 = 3x - 2$$

$$49 = 3x - 2$$

$$51 = 3x$$

$$17 = x$$

stuck in log form
change to exp.

Example: $\log_6 3x + \log_6(x - 4) = 2$

Stuck in log form

$$\log_6 3x(x-4) = 2$$

$$6^2 = 3x^2 - 12x$$

$$36 = 3x^2 - 12x$$

$$0 = 3x^2 - 12x - 36$$

$$0 = x^2 - 4x - 12$$

$$(x-6)(x+2)$$

$$x=6, \quad x=\cancel{-2}$$

A#33 pg 519 4 – 20 even, 25 – 43 odd

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

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. $0.5^x - 0.25 = 4$

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