Name: _____ Date: _____ Block: _____

Solving Log Equations All

Solve each log equation. Be sure to check your answers.

1. $\log_5 5x = 2$

$5^2 = 5x$

$\frac{5}{5} = \frac{5x}{5}$

$x = 5$

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

$4 = 2x - 3$

$x = \frac{12}{2}$

$x = 6$

3. $2\log_4 x = 3$

$4^3 = x^2$

~~$x = \pm 8$~~

$x = 8$

4. $\ln(x+3) = 4$

$e^4 = x + 3$

$x = e^4 - 3$

5. $\log_{25} x = \frac{3}{2}$

$25^{\frac{3}{2}} = x$

$125 = x$

6. $\ln(2x) = 6$

$e^6 = 2x$

$x = \frac{1}{2}e^6$

7. $\log_4 5x = \log_4 2$

$5x = 2$

$x = \frac{2}{5}$

8. $\ln 4 - \ln x = \ln 3$

$\ln \frac{4}{x} = \ln 3$

$\frac{4}{x} = 3$

$x = \frac{4}{3}$

9. $\log_3 x = 2\log_3 3 + \log_3 5$

$\log_3 x = \log_3 9 \cdot 5$

$x = 45$

10. $\log_4(3x-1) = \log_4(2x+3)$

$3x - 2 = 2x + 3$

$x = 5$

11. $\log_4(4x+3) = \log_4(3x-6)$

$4x + 3 = 3x - 6$

$x = -9$

$\varnothing$

12. $\log_5 2 + \log_5(3x-2) = 1$

$\log_5 6x - 4 = 1$

$5^1 = 6x - 4$

$9 = 6x$

$x = \frac{3}{2}$

13. $2\log_3 6 + \frac{1}{4}\log_3 16 = \log_3 x$

$\log_3 36 + 2 = \log_3 x$

$x = 72$

14. $\log(x^2+16) = \log 80$

$x^2 + 16 = 80$

$-16 \quad -16$

$x^2 = 64$

$x = 8$

$x = -8$

15. $\log_5(x^2+7) = \frac{2}{3}\log_5(64)$

$x^2 + 7 = 16$

$x^2 = 9$

$x = 3$

$x = -3$

Name _____ Period _____ Date _____

Exponential and Logarithmic Equations

Part 1: Find the solution of the exponential equation, correct to four decimal places.

1. $6^x = 12$

2. $10^{-x} = 2$

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

4. $2e^{0.3x} = 17$

5. $2\left(1+10^{kt}\right) = 9$

6. $2^{x^2} = 34$

7. $3^{\frac{x}{0.4}} = 0.1$

8. $e^{3-5x} = 16$

9. $\left(\frac{1}{x}\right)^x = 75$

10. $10^{3-x} = e^x$

11. $7^{\frac{x}{3}} = 5^{1-x}$

12. $3^{2x+1} = 4^{x+2}$

13. $\frac{10}{1+e^{-x}} = 2$

14. $(1.00625)^{12t} = 2$

15. $6(2)^{2x+1} - 1 = 4$

Part 2: Solve the logarithmic equation for x.

16. $\ln(x-2) = \ln(4x+5)$

17. $\log_2 x + \log_2(x-1) = \log_2 20$

18. $2\log x = \log 2 + \log(3x-4)$

19. $\log_2 3 + \log_2 x = \log_2 5 + \log_2(x-2)$

20. $\log_4(x-1) - \log_4(x+6) = \log_4(x-2) - \log_4(x+3)$

21. $\log 4 - \log 5 = \log(x-1) - \log(2x+1)$

22. $\log_4(x+2) = 4$

23. $\log_2(x+1) - 2 = \log_4(x-1)$

24. $\ln(3x+4) = 3$

25. $2\log_4 x - \log_2 9 = 2$

26. $\log_2(3x-2) - \log_4 x = 3$

27. $\log(x+21) = 2$

28. $\log_5 \frac{1}{5} + 2\log_5 x = 8$

29. $\ln(x-1) + \ln(x+2) = 1$

30. $\log_3(x^2 - x - 21) = 2$

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