Advanced Algebra Name _____
Homework 8.6
Solving Exponential and Logarithmic Equations Period _____

SHOW ALL WORK. *(Round all decimal answers to the nearest thousandth)*

Complete Parts A & B OR Parts B & C

PART A:

Solve for x.

1. $5^{x-4} = 25^{x-6}$

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

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

4. $8^{x} = 20$

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

6. $7^{3x} = 18$

7. $11^{5x} = 33$

8. $7^{6x} = 12$

9. $4e^{-2x} = 17$

Solve for x. Check for extraneous solutions.

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

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

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

13. $\log_4 x = -1$

14. $5\ln x = 35$

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

16. You deposit $100 in an account that pays 6% annual interest, compounded quarterly. How long will it take for the balance to reach $1000?

PART B:

Solve for x.

17. $27^{4x-1} = 9^{3x+8}$

18. $25^{10x+8} = \left(\frac{1}{125}\right)^{4-2x}$

19. $3^{3x-7} = 81^{12-3x}$

20. $10^{3x} + 4 = 9$

21. $-3e^{2x} + 16 = 5$

22. $0.5^{x} - 0.25 = 4$

Solve for x. Check for extraneous solutions.

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

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

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

26. $4\ln(-x) + 3 = 21$

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

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

29. One hundred grams of radium are stored in a container. The amount R (in grams) of radium present after t years can be modeled by $R = 100e^{-0.00043t}$. After how many years will only 5 grams of radium be present?

PART C:

Solve for x.

30. $36^{5x+2} = \left(\frac{1}{6}\right)^{11-x}$

31. $10^{3x-10} = \left(\frac{1}{100}\right)^{6x-1}$

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

33. $\frac{1}{3}(6)^{-4x}+1=6$ **34.** $2^{0.1x}-5=7$ **35.** $\frac{3}{4}e^{2x}+\frac{7}{2}=4$

Solve for x. Check for extraneous solutions.

36. $\log_3(x-9)+\log_3(x-3)=2$ **37.** $\log_2(x+1)=\log_8 3x$ **38.** $\log_3 x=\log_9 6x$

39. You plant a sunflower seedling in your garden. The seedling's height *h* (in cm) after *t* weeks can be modeled by the function $h(t)=\frac{256}{1+13e^{-0.65t}}$. Find the time it takes the sunflower to reach a height of 200 cm.