Secondary Math 3 Name _____

5-3 Solving Logarithmic Equations Period _____

Solve the following equations graphically.

1. $4e^{0.1x} = 60$

2. $120 = 75e^{3x}$

3. $62 = 50e^{0.02x}$

Solve the following equations algebraically

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4. $6^{3x-9} - 10 = -3$

5. $7e^{3x} = 42$

6. $11^{6x+2} = 12$

7. $5^{\frac{x}{4}} = 30$

8. $3\ln(x-3) + 4 = 5$

9. $\ln x^2 = 4$

10. $\log_4(x-5) = -1$

11. $log_6(4x + 8) = 2$

12. The price *P* of a gallon of gas after *t* years is given by the equation $P = P_0 (1 + r)^t$ where P_0 is the initial price of gas and *r* is the rate of inflation. If the price of a gallon of gas is currently $3.25, how long will it take for the price to rise to $4.00 if the rate of inflation is 10.5%?

13. A veterinarian has instructed Harrison to give his dog one 325-mg aspirin tablet for arthritis. The amount of aspirin, A, remaining in the dog's body after t minutes can be expressed by $A = 325\left(\frac{1}{2}\right)^{\frac{t}{16}}$. How long will it take for the amount of aspirin to drop to 50-mg?

14.How long will it take for a $150 initial investment in an account that pays 3.8% compounded continuously to grow to $1,500?

Review

Write each expression as a single logarithm.

15. $3\log_2 a + 9\log_2 b$

16. $2\ln 6 - 6\ln 5$

17. The population of Smallville in the year 1890 was 6,250. Assume the population increased at a rate of 2.75% per year.

    a. Find the population in 1915.

    b. Find the population in 1940.