HW 3-3H Solving Logarithmic Equations
Secondary III

Name: _____
Date: _____ Class: _____

Solve the following equations algebraically.

1. $9e^{3x} = 27$

2. $9e^{x} = 27$

3. $9e^{3x-4} = 27$

4. $9e^{3x} + 2 = 27$

5. $6^{3x-9} - 10 = -3$

6. $7e^{3x} = 42$

7. $11^{6x+2} = 12$

8. $5^{\frac{x}{4}} = 30$

9. $3\ln(x-3) + 4 = 5$

10. $\ln x^2 = 4$

11. $\ln(x-3) + \ln(x+4) = 3\ln 2$

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

13. 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%?

14. A veterinarian has instructed Harrison to give his 75-lb 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?

15. On the Richter scale, the magnitude M of an earthquake depends on the amount of energy, E (measured in ergs), released by the earthquake as follows:
$M = \frac{2}{3}\log\frac{E}{10^{11.8}}$ In 1985, an earthquake hit Mexico City and measured 8.1 on the Richter scale. Find the amount of energy, E, released by this earthquake.

Review

1. The population of Smallville in the year 1890 was 6250. Assume the population increased at a rate of 2.75% per year. Find the population in 1915 and 1940.

Selected Answers:

2. x=0.47

4. x=3.36

6. x=-0.16

8. x=4.40

10. x=-5, 4

12. 2.08 years

10. 20 times more severe

11. x=1.0999 B
x=0.341 D
x=0.366 A
x=1.700 C