PreCalculus Name_____________________________ Per.________

Exponential, Logarithmic and Logistic Review
Reporting Standard: *3. Exponential & Logarithmic Functions*

Solve the equation.

1) $2^{(7 - 3x)} = \frac{1}{4}$

2) $81^x = \sqrt{3}$

3) $16^{(x + 6)} = 64^{(x - 8)}$

4) $e^{x + 8} = \frac{1}{e^4}$

Solve the logarithmic equation. Be sure to reject any value that is not in the domain of the original logarithmic expressions. Give the exact answer.

5) $2 + 3 \ln x = 7$

6) $\ln 6 + \ln (x - 1) = 0$

7) $\log_6 x + \log_6 (x - 35) = 2$

8) $\log_3 (x - 2) - \log_3 (x - 3) = 1$

9) $\log_3 (x + 6) + \log_3 (x - 6) - \log_3 x = 2$

Solve the problem.

10) A sample of 700 g of lead-210 decays to polonium-210 according to the function given by $A(t) = 700e^{-0.032t}$, where t is time in years.

a. What is the amount of the sample after 100 years (to the nearest g)?

b. How long will ot take for the sample to decay to 100 grams?

11) A city is growing at the rate of 0.3% annually. If there were 5,108,000 residents in the city in 1993, find how many (to the nearest ten-thousand) are living in that city in 2000. Use $y = 5{,}108{,}000(2.7)^{0.003t}$.

12) The formula $A = 118e^{0.024t}$ models the population of a particular city, in thousands, t years after 1998.

What will the population be in 2015?

By what year will the population have tripled?

13) Suppose that you have \$11,000 to invest. Which investment yields the greater return over 10 years: 6.25% compounded continuously or 6.3% compounded semiannually?

14) The logistic growth function $f(t) = \frac{87,000}{1 + 1449e^{-1.2t}}$ models the number of people who have become ill with a particular infection t weeks after its initial outbreak in a particular community.

a. How many people were infected initially?

b. What is the total number of people who can become infected?

c. How many people were ill after 9 weeks?

d. How many weeks would it take for 20% of the population to be ill?