Name _____

Solving Exponentials with Logarithms
(Straight from Algebra 2)

Kaylynn has invested $2000 in a CD she purchased through Math Rules National Bank. She has secured a 3% APR compounded annually. How long will it take her until she has earned exactly enough money to buy that Bowflex that is being advertised for "only $2318.55!, tax included"?

Write an exponential equation to model this investment situation:

HOW TO SOLVE FOR AN EXPONENT:

Solve for x:

A. $10\,(2)^X = 80$

B. $3^x = 11{,}364$

C. $512 = \left(\dfrac{1}{2}\right)^x$

1. Carbon-14, a radioactive form of carbon that decays exponentially with a half-life of 5730 years, helps archaeologists determine the age of fossils.

   a. Write an equation that models the exponential decay of 10 g of Carbon-14. Explain what your variables represent. BE SPECIFIC!!

   b. Suppose a fossil of an organism that originally contained 10 g of Carbon-14 now contains 1.25 g of Carbon-14. How many years ago did the organism die?

2. Car dealers use the "rule of thumb" that a car loses about 30% of its value each year. Suppose that you bought a used car in 2003 for $23,500.

   a. Write a function, which models the value of your car at any particular time. _____

   b. The original purchase price of this car was $40,000. How long ago was it purchased?

   c. Use your function to figure out how long it will take for your car to depreciate to half of what you bought it for.

3. Ms. Bosman wants to buy a house. She needs 20% of the house value for a down payment. The house she wants to buy is $100,000. She currently has $16, 000 invested in CD's that are compounded yearly with an APR of 6.25%. How long will she need to save her money until she can finally buy her house?

4. Write a situation that would be modeled by the equation: $1200 = 300\left(1+\dfrac{.04}{12}\right)^{12t}$. Then, solve.

5. $150,000 = 2000\left(1+\dfrac{.06}{4}\right)^{4t}$

6. $1500 = 500e^{6r}$