HOMEWORK: MODELING LOG FUNCTIONS

NAME: _____ DAY 7 DUE: _____

You may use a calculator to find approximate values, but make sure you have the EXACT values as well.

1. Plutonium – 239 (commonly used in nuclear power plants) has a half – life of 24,100 years! One plant can use up to 300 kilograms of plutonium – 239 each year. How long will it take 300 kilograms of plutonium to decay to a size of 50 kilograms?

2. A mummy discovered in a pyramid in the Valley of the Tomb of Kings had lost 46% of its carbon. How old is the mummy?

3. Suppose $10,000 is invested at 10% interest compounded annually. The investment yields $19,487. For how many years was the amount invested?

4. When a person takes a dosage of M milligrams ibuprofen, the amount A (in mg)of medication remaining in the person's bloodstream after t hours can be modeled by the equation $A = M(0.71)^t$. How much ibuprofen is in a person's bloodstream if he takes a 250 milligram dosage after 3 hours? After 6 hours?

5. The iodine that is released from a power plant is Iodine 131. It has a half-life of 10 days. If the plant leaks 100 pounds of Iodine 131, when will only 5 pounds remain in the environment?

6. If the plant leaks 100 ounces cesium 137 which has a half-life of 30 years, how much will be left after 200 years?

7. (a) Archeologists use carbon dating to tell how long something has been deceased. When an organism dies, it takes in no more carbon. Carbon – 14 has a half – life of 5730 years. How old is an animal bone that has lost 30% of its carbon – 14?

   (b) A piece of wood discovered at a Mesopotamian civilization site was found to have lost 62% of its carbon. What is the approximate age of the wood?