Name _____   Date _____
Mr. Schlansky   Algebra II

Exponential Modeling Finding P and t

1. Melanie's car is currently worth $22,000. She bought it 3 years ago and the depreciate rate is compounded continuously at 7%. What was the initial value of the car?

2. Megan's savings account currently has $5,125 in it. If the account was opened 4 years ago and has an interest rate of 4.3% compounded weekly, how much money was initially put into the account?

3. If the current balance of a bank account is $4,321 and the account was opened 3 years ago with an interest rate of 3% compounded continuously, what was the initial amount of the account?

4. Manny's savings account has a balance of $6,391.52. He opened the account with $5500.00 with a 5.2% interest rate that is compounded quarterly. How many years ago was the account opened?

5. If a bank account was opened with $3000 and interest is compounded continuously at 5.2%, how much time has passed if there is now $4000 in the account?

6. Danielle currently has $2125 in her savings account. If she opened the account with $1700 and the account has an interest rate of 4.1% that is compounded continuously, how long has the account been open?

7. Mike's bank account has tripled since he opened the account. If he opened the account with $1000 and interest is compounded monthly at a rate of 8.1%, how much time, to the *nearest year*, has the account been open?

8. The amount of money in Jennifer's bank account has increased by 25% since she opened it. The initial investment was $4800. If the interest is compounded continuously at a rate of 5.8%, how much time, to the *nearest tenth of a year*, has passed since the account has been opened?

9. The value of a $24000 car depreciates at a rate of 11% per year annually. After how many years will the car be worth 30% of its original value? Round your answer to the *nearest year*.

10. Joe Manana just opened a bank account with a $2000 initial balance. If the interest is compounded quarterly at a rate of 6.7%, how long would it take for his money to double?

11. Jeff opened a bank account with a principal balance of $2000. Interest is compounded monthly at a rate of 1.4%. After how many years, to the *nearest tenth of a year*, will it take for Jeff's account to increase by 50%?

12. Seth's parents gave him $5000 to invest for his 16th birthday. He is considering two investment options. Option *A* will pay him 4.5% interest compounded annually. Option *B* will pay him 4.6% compounded quarterly. Algebraically determine, to the *nearest tenth of a year*, how long it would take for option *B* to double Seth's initial investment.

13. One of the medical uses of Iodine–131 (I–131), a radioactive isotope of iodine, is to enhance x-ray images. The half-life of I–131 is approximately 8.02 days. A patient is injected with 20 milligrams of I–131. Determine, to the *nearest day*, the amount of time needed before the amount of I–131 in the patient's body is approximately 7 milligrams.

14. The half-life of carbon-15 is 2.449 seconds. If Jackie has 17500 grams of carbon-15, write an equation that will represent the amount of grams of carbon-15 remaining after t seconds. After how much time will there be 500 grams of carbon-15 remaining? Round your answer to the *nearest tenth of a second*.

15. Jessica deposits $2000 into a bank account where 4% interest is given every 2.4 years. To the *nearest tenth of a year*, how long will it take for Jessica's investment to reach $5000?

16. The value of a stock doubles every 12 days. If the initial value of the stock was $1500, how many full days will it take the stock to increase by 60%?

17. Christopher and Nolan are both preparing for the Nassau County Spelling Bee. There are a total of 5000 words that they are responsible for knowing how to spell. Currently, Christopher knows 1200 words and Nolan knows 1000 words. Every 4 days, Christopher will learn 20% of the remaining words. Every 6 days, Nolan will learn 25% of the remaining words.
Create two functions to represent how many words Christopher and Nolan will be able to spell after d days. After how many days will they be able to spell the same number of words rounded to the nearest day.

18. A radioactive substance has a mass of 140 g at 3 p.m. and 100 g at 8 p.m. Write an equation in the form $A = A_0 \left(\dfrac{1}{2} \right)^{\frac{t}{h}}$ that models this situation, where h is the constant representing the number of hours in the half-life, A_0 is the initial mass, and A is the mass t hours after 3 p.m. Using this equation, solve for h, to the *nearest ten thousandth*. Determine when the mass of the radioactive substance will be 40 g. Round your answer to the *nearest tenth of an hour*.