Pre-Calculus CP 1 – Section 3.5 Day 2 HW   Name: _____
Application Word Problems!

1. A deposit of $10,000 is made in a savings account for which the interest is compounded continuously. The balance will double in 5 years.

   a) What is the annual interest rate for this account?

   b) Find the balance after 1 year.

2. The half-life of radioactive uranium II is 250,000 years. What percent of a present amount of radioactive uranium II will remain after 5000 years?

3. The population of South Carolina (in thousands) from 1990 through 2003 can be modeled by $P(t) = 3499e^{0.0135t}$, where t is the time in years, with t = 0 corresponding to 1990. According to this model, when will the population reach 4.5 million?

Application Word Problems!

4. In a typing class, the average number N of words per minute typed after t weeks of lessons was found to be

$$N = \frac{157}{1 + 5.4e^{-0.12t}}$$

a) What is the carrying capacity for this problem?

b) Find the time necessary to type 50 words per minute

5. The relationship between the number of decibels B and the intensity of a sound I in watts per square centimeter is $B = 10\log\left(\frac{I}{10^{-16}}\right)$. Determine the intensity of a sound in watts per square centimeter if the decibel level is 125.

Application Word Problems!

6. On a day a person is born, a deposit of $50,000 is made in a trust fund that pays 8.75% interest, compounded continuously.
    a) Find the balance on the person's 35th birthday.

    b) How much longer would the person have to wait for the balance in the trust fund to double over the amount they have when they're 35?

7. Let Q represent a mass of plutonium 241 in grams, whose half-life is 14.4 years. The quantity of plutonium 241 present after t years is given by $Q = 100\left(\dfrac{1}{2}\right)^{t/14.4}$

    a) Determine the initial quantity

    b) Determine the quantity present after 10 years.

Application Word Problems!

8. The antler spread **a** (in inches) and shoulder height **h** (in inches) of an adult male American elk are related by the model $h = 116\log(a+40) - 176$. Approximate the shoulder height of a male American elk with an antler spread of 55 inches.

9. Mrs. Collins is making cookies and her kids love to eat them right away! She bakes them in a 350 degree (F) oven and when they are done she cools them in a 70 degree (F) room. Brady comes over and tries to take a bite one minute after she took them out of the oven but she shoos his hand away! They are much too hot to eat at a roasty 270 degrees (F)! He asks, "When can I come back and eat them?" If Mrs. Collins considers 150 degrees to be acceptable, what time should she tell him to return?

10. Suppose a body is 83°F at 10 PM and that the air temperature around it is 42°F. After one hour the body is found to be 76°F. Assuming the Estimate the time of death.

Application Word Problems!

9. Detectives respond to a call at Dunkin Donuts made by Peter at exactly 5:10 AM. When they arrive Peter is panicked and visually upset. He says she arrived at work around 5 AM to open the store with a fellow worker. Peter has a witness in her father who says he dropped him off at exactly 5 AM. Peter tells the police that when he entered the store his fellow co-worker was already dead. The coroner arrives to take some temperatures and finds that the body is 85°F and the room its in is kept at a constant 68°F. These temperatures are taken at exactly 5:55 AM. Two hours later the coroner takes the second temperature reading. He finds the body to be 74°F and the room to still be 68°F. Should the police consider Peter a suspect?