

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?

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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.

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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.
- Find the balance on the person's 35th birthday.
 - 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 $Q = 100\left(\frac{1}{2}\right)^{t/14.4}$
- Determine the initial quantity
 - Determine the quantity present after 10 years.

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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. Detectives respond to a call at Dunkin Donuts made by Dana at exactly 5:10 AM. When they arrive Dana is panicked and visually upset. She says she arrived at work around 5 AM to open the store with a fellow worker. Dana has a witness in her father who says he dropped her off at exactly 5 AM. Dana tells the police that when she entered the store her 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 Dana a suspect?
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.