4. [13 points] For each problem on this page, show your work step-by-step. (Don’t forget to use appropriate units in your answers.)

Ozone is a molecule consisting of three oxygen atoms that is unstable and decays to the stable form of oxygen. The half-life of gaseous ozone at a temperature of 20°C is 3 days (72 hours).

a. [4 points] Find the continuous hourly percent decay rate of gaseous ozone at 20°C. 
   *Give your answer in exact form.*

   **Answer:**

b. [4 points] At a temperature of 20°C, how long does it take for the amount of gaseous ozone to be reduced by 90%? *Give your answer in exact form.*

   **Answer:**

When ozone is dissolved in water, it is referred to as “aqueous ozone.” At a temperature of 20°C, aqueous ozone decays at a rate of 12.5% per hour.

c. [5 points] Suppose that in a 20°C lab, the amount of aqueous ozone is initially 5 times the amount of gaseous ozone. When will the two amounts be equal? 
   *Give your answer in exact form.*

   **Answer:**