

3. Complete #4 on page 243.

4. A bacteria culture grows with constant relative growth rate. The bacteria count was 400 after 2 hours and 25,600 after 6 hours.
- (a) What is the relative growth rate? Express your answer as a percentage.
 - (b) What was the initial size of the culture?
 - (c) Find an expression for the number of bacteria after t hours.
 - (d) Find the number of cells after 4.5 hours.
 - (e) Find the rate of growth after 4.5 hours.
 - (f) When will the population reach 50,000?

4. The half-life of radium-226 is 1590 years. Suppose we have a sample of radium-226 of mass 100 mg. (a) Find a model for the mass of the sample after t years. (b) Find the mass of the sample after 1000 years. (c) When will the mass be reduced to 30 mg?

5. How long will it take an investment of \$1000 to double if the interest rate is 6% compounded continuously?

6. **Newton's Law of Cooling**: Suppose an object is cooling in an environment with constant temperature T_e . Set up and solve the differential equation defined by the statement: "The rate of change of the temperature of the object is directly proportional to the difference of the temperature of the object and the constant environmental temperature."
7. A can of Coke at room temperature (72°F) is placed in a refrigerator set to 40°F . After 30 minutes, the can of Coke has cooled to 60°F . How long will it take the can of Coke to cool to 50°F ? What is the limiting value of the temperature of the can of Coke?