

Name _____

Homework 3
Section 1.4

1. (4) A colony of bacteria grows in a controlled environment according to the function $Q(t) = 12000(1.015)^t$, where t is measured in weeks.
 - (a) What is the weekly growth rate (as a percentage) of the bacteria population?

 - (b) What is the annual growth rate (as a percentage) of the bacteria population? (Use the standard of 52 weeks in a year).

2. (3) A population starts at 1.2 million and increases at an annual rate of 5.9%. What is the annual *continuous* growth rate of the population? (Round to 2 decimal places)

3. (4) A particular substance decays at a rate of 4% per day. What is the half-life of the substance?

4. (4) Solve the equation: $\log_3(x - 3) = 2 - \log_3(x + 5)$

5. (5) In order to finance some evil experiments, Dennis the mad scientist decides to start a cricket farm. He starts with a habitat that is initially stocked with 2000 crickets, and determines that the population will grow according to the logistics curve $P(t) = \frac{20,000}{1 + 9e^{-t/7}}$, where t is measured in months since the habitat was stocked. How long will it take for Dennis to have 9,000 crickets? (Round to the nearest month)