Problem 1. A pork roast is removed from the freezer (25°F) and placed in a room (75°F). The number of minutes it takes the temperature of the roast to reach x degrees F is given by the formula $T = f(x) = \frac{100}{3} \ln\left(\frac{50}{75-x}\right)$. Find and interpret $f^{-1}(70)$.

Problem 2. New employees are given an initial exam and then retested monthly with an equivalent exam. The average scores for the employees can be expressed as $S(t) = 76 - 6 \cdot \log_3(t+1)$ where t is measured in months since the initial exam. After approximately how many months would the average score be 54?

Problem 3. The temperature of a cup of hot tea, in °F, is represented by the function $H(t) = 72 + 102e^{-0.023t}$, where t represents time in minutes since the cup of tea was placed on the kitchen counter. Use the function to determine how long it will take for the cup of tea to cool to 120°F.

Problem 4. A population of ladybugs grows according to the limited growth model $A = 400 - 400e^{-0.04t}$ where t is measured in weeks, $t \geq 1$. After how many weeks will the population be approximately 300 ladybugs?

Problem 5. A colony of bacteria grows from 300 to 1300 in 7 hours. Assume the population can be modeled by $A = pe^{rt}$, where t is measured in hours. Determine the tripling time of the bacteria?

Problem 6. A population of lemmings declined rom 100,000 to 75,000 in 3 months. Assuming an exponential pattern of decline, approximately how many will be remaining after another 3 months pass?