Math 112 Written Homework: Logarithmic Functions

Student Name:_____
Instructor: Laird
Math 112 Section: 062

Directions: Show all work, and answer each question that is asked. Explanations should be given in complete sentences. All graphs should be drawn accurately on this sheet, and be fully labeled.

1. A ham is taken out of a 165 degrees F oven, and placed in a room that is 78 degrees F. The amount of time it takes for the ham to cool to a temperature of x degrees F is given by the equation $f(x) = 100 \cdot \ln\left(\frac{87}{x-78}\right)$.

   Define the variables:

   x :

   f :

   Use the graph of the function to determine the temperature of the ham after 13 minutes.

   Write the equation that needs to be solved to answer this question.

   Convert this equation to exponential form, and solve for the answer algebraically.

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2. $5,000 is invested in an account bearing 10% interest compounded continuously. The amount of time it takes for the money to grow by a factor of x is given by $t = f(x) = 10 \cdot \ln(x)$. (For example, the amount of time required for the investment to double is $f(2) = 10 \cdot \ln(2)$.)

   Define the variables:

   x :

   t :

   How long will it take the balance in the account to reach $7,500?

   Find a formula for the inverse function.

   Evaluate $f^{-1}(8)$ and explain what this tells you in practical terms.

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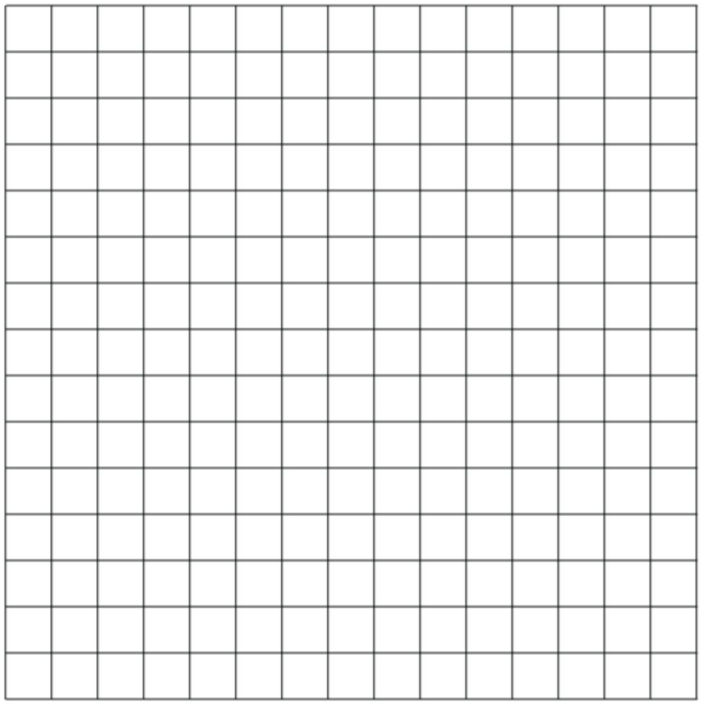
3. Scientist have found that the relationship between the area of an island and the number of species can be modeled approximately by $S = -3.404 + 103.2\ln(A)$, where A is the area in km^2 and S is the number of species.

   Define the variables:

   S :

   A :

   Graph this function.



   Using exponentials, determine $S^{-1}(388)$. What does this mean in practical terms?