Math 112 Written Homework: Logarithmic Functions

Name: _____

Instructor: Taryn Laird

Math 112 Section: 006

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 87 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 $f(x) = 100 \cdot \ln\left(\frac{78}{x-87}\right)$. Determine the temperature of the ham after 15 minutes. (Hint: 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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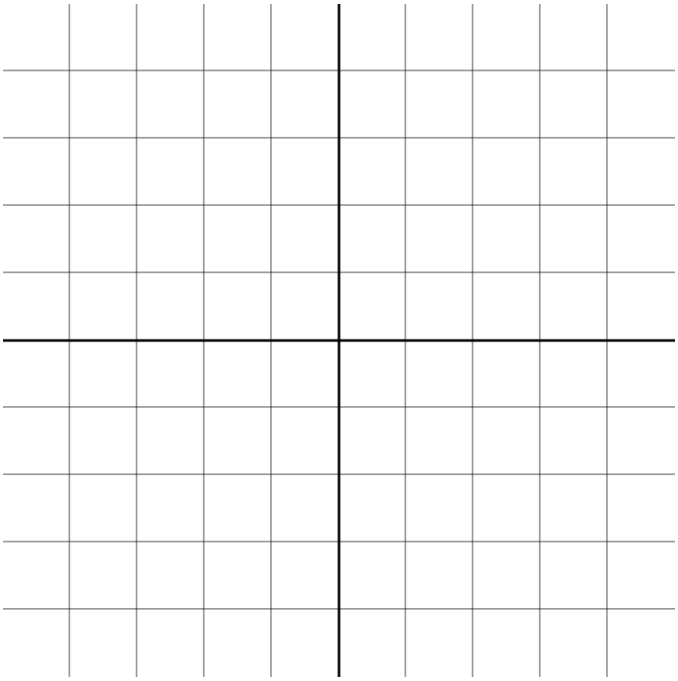
2. A music theorist associates the fundamental frequency of a pitch f ,with a real number, p, defined by:

$$p = 69 + \frac{12ln\left(\frac{f}{440}\right)}{\ln(2)}.$$

Graph this function.



Using the graph, find the frequency, f, that produces a p value of 75.

Using the graph, find the frequency, f, that produces a p value of 192.

Write the equation that can be used to find these values algebraically.

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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 $S = -3.404 + 103.2lnA$, where A is the area in km^2 and S is the number of species. Using exponentials, determine $S^{-1}(174)$. What does this mean in practical terms?