Math 112 Written Homework: Inverse 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. Earlier in the semester, we found that the cost function for producing x pairs of a particular type of skates was given by: $C(x) = 742.72 + 43.53x$.

   Define the variables:

   x :

   C :

   What is the inverse of this function?

   What does the inverse function represent?

   Find one ordered pair that would be on the graph of the inverse function (you don't have to sketch the graph).

   Describe what it tells you about this situation. Make sure your answer makes sense.

   Use the inverse to determine the number of pairs of skates that can be produced for an initial investment of $10,000. Explain your reasoning.

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2. Shelby invests \$100 in a bank account that earns a fixed 2% interest compounded annually. The amount in the account after t years is given by $f(t) = 100(1.02)^t$.

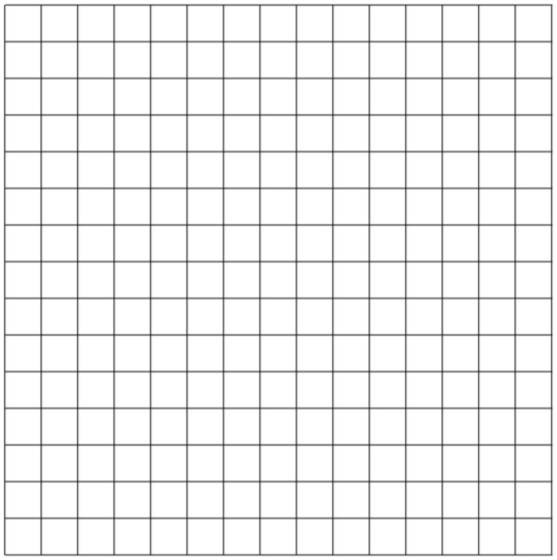
   Define the variables:

   t :

   f :

   Graph this function on your calculator in an appropriate window. (You do not have to provide a sketch of $f(t)$.) Explain how you know this function has an inverse function.

   Use the graph of $f(t)$ to sketch an accurate graph of the inverse function in an appropriate window. Label quantities and scales on both axes.



   What are the domain and range of the inverse function?

   Domain:

   Range:

   Pick one ordered pair on the graph of the inverse function, and describe what it tells you about this context.

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3. Find the inverse of the function $h(x) = 5x^3 - 2$.

Check your answer by performing the composition of the two functions.

$h \circ h^{-1}$	$h^{-1} \circ h$

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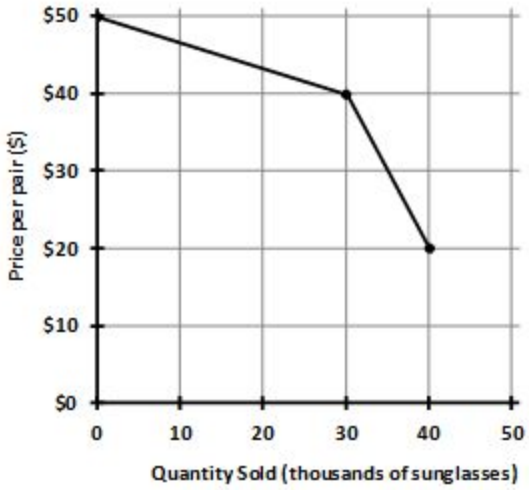
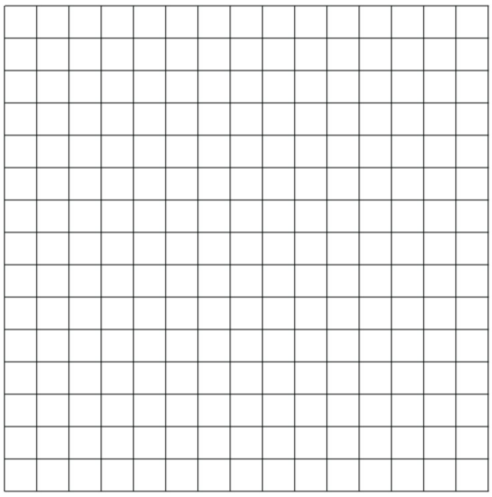
4. A sunglass manufacturer finds that consumer demand of a certain line of sunglasses varies based on price. Market studies predict the relationship is approximated by the function $p = f(q)$ graphed below, where q represents the quantity of sunglasses sold in thousands and p represents the price in dollars.



Sketch a graph of the inverse function.



Find and interpret the real-life meaning of $f^{-1}(40)$.