This assignment is designed to help you systematically go through the material from Chapter 1, and practice answering questions like those I might put on a test. It is NOT an optional assignment; it is due Monday, January 25 at the beginning of class. Also, consult your syllabus for information about how written assignments are graded.

Answer the following questions, in your own words:

1. What does the vertical line test tell you about a curve in the plane? 
   Using the definition of a function, and some pictures if necessary, explain why the vertical line test works.

2. What does the horizontal line test tell you about a curve in the plane? 
   Using the definition of an inverse function, and some pictures if necessary, explain why the horizontal line test works.

3. Draw a curve in the plane that has an inverse. Then, draw its inverse. 
   Describe (in words) how you were able to find the inverse without knowing the function algebraically, and explain why this process works.

4. The following questions will refer to the function \( f(x) = 3 \cos(x - \pi) + 1 \) for all real \( x \).
   (a) Draw a sequence of graphs, ending with the graph of \( f \), that shows the necessary shifts, reflections, stretches, etc. that are necessary to obtain the graph of \( f \) from a fundamental function.
   (b) What is the domain and range of \( f \)? What is the period of \( f \)?
   (c) Draw a graph of \(|f(x)|\).
   (d) Find functions \( g, h, j \) such that \( f(x) = (g \circ h \circ j)(x) \). What is \((j \circ h \circ g)(x)\)? Are these the same function? Why or why not?
   (e) Does \( f \) have an inverse function? If not, does \( f \) have a restricted domain that does have an inverse? If the answer is yes, explain why, give the restricted domain, give an algebraic expression for the inverse, and draw a graph of the inverse function.