Subject: Mathematics - Pre-Calculus   Grade: Eleventh

Standard: #1 Functions

Key Concept: Students use polynomial, rational, and algebraic functions.

Generalization: Students make connections between a problem, its model as the equation of a function, and the graph of that function.

Background:
    This lesson is adapted from the book <u>A Watched Cup Never Cools</u>, ISBN#1-55953-318-8, Writing Assignment 2. This lesson should be presented about midway through the course.

    Students should already be familiar with functions and have modeled several physical situations using equations.   An example is given in Indiana's Academic Standards for Pre-Calculus, page 3.

    Students should work individually to complete this lesson.

This lesson is tiered in ***process and product*** according to ***readiness***.

Tier I: ***Basic Learners***
    Students in this tier are given a problem which the whole class has already worked or which was used by the teacher for demonstration. That is, students should be able to recall the problem and the related function. The students are to use their text to write a mathematical definition of function, being specific about the function which is related to the problem. Students are given a teacher prepared nonmathematical definition of a function from an everyday use of the word. Students prepare a graph of their function and compare/contrast diagram of the two definitions.

Tier II: ***Grade Level Learners***
    Students in this tier are given a problem which they have not seen before. Students have to determine and specify the related function. The students write

a mathematical definition of function in their own words, being specific about the function which is related to the problem. Students are given a teacher prepared nonmathematical definition of a function from an everyday use of the word outside of mathemaitcs. Students prepare a graph of their function and a venn diagram to compare/contrast the two definitions.

Tier III: *Advanced Learners*
Students in this tier are given several related problems some of which they may have never seen before. Students have to determine and specify the related general function which works for all the problems. The students write a mathematical definition of function using their own words, being specific about the function which is related to the problem. Students write a nonmathematical definition of a function from an everyday use of the word outside of mathematics. Students prepare a graph of their general function and write a short description explaining how and why it varies. Students prepare a short paper, 1-2 pages, which compares/contrasts the two definitions of function.

Assessment:
The graphs should be graded for accuracy. A rubric for each product, compare/contrast diagram, venn diagram, or short paper, should be prepared and distributed to students before the assignment.