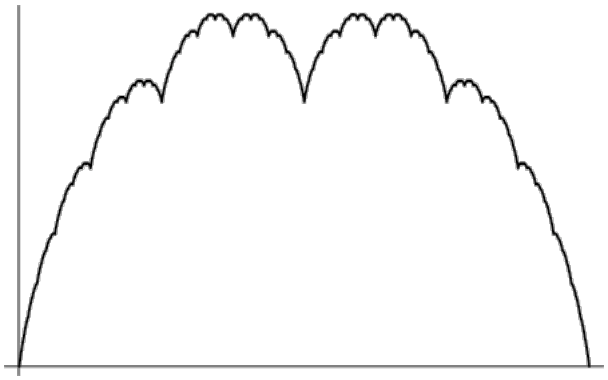
Math S-Xab Summer 2004
Worksheet: Continuity
July 13, 2004

1. Determine whether each of the following functions is continuous.
   (a) The temperature at a specific location as a function of time.
   (b) The temperature at a specific location as a function of distance due west of Boston.
   (c) The altitude above sea level as a function of distance due west of Boston.
   (d) The cost of a taxi ride as a function of distance traveled.
   (e) $f(x) = \frac{1}{x+2}$
   (f) $f(x) = \frac{|x|}{x}$
2. Determine whether each of the following statements is true or false.
   (a) Suppose that during half-time at a basketball game, the score of the home team was 36 points. Then there had to be at least one moment in the first half when the home team had exactly 25 points.
   (b) The function $x^5 + x^4 - 1$ has a root in the interval $[0, 2]$.
   (c) At some time since you were born your weight in pounds equaled your height in inches.
   (d) Along the Equator, there are two diametrically opposite sides that have exactly the same temperature at any given time.
3. Let f be a continuous function on the closed interval $[0, 1]$. There exists a positive number A so that the graph of f can be drawn inside the rectangle $0 \leq x \leq 1$, $-A \leq y \leq A$. The above statement is:
   (a) Always true
   (b) Sometimes true
   (c) Never true



The Blancmange Function