1. Suppose $f(x) = \big|x - |x-3|\big|$. $f(x)$ is defined for all real numbers.

a) Find the graph of $y = f(x)$ in the window $-5 \le x \le 5$ and $0 \le y \le 10$.

b) Give a piecewise definition (on all of its domain) of $f(x)$ *without* using absolute value. The graph may help to answer this question, but justify your answer algebraically with a case-by-case argument from the equation for y. Your justification could begin with a statement such as, "When $x \ge 3$, then y is given by the formula ... because ...".

2. Suppose $f(x) = \sqrt{\frac{x}{4-x}}$.

a) Find the graph of $y = f(x)$ in the window $-5 \le x \le 5$ and $0 \le y \le 10$.

b) What is the domain of f? Verify your statement algebraically.

c) Solve $y = f(x)$ for x. What is the range of f? Your expression for x in terms of y may help to verify your statement algebraically.

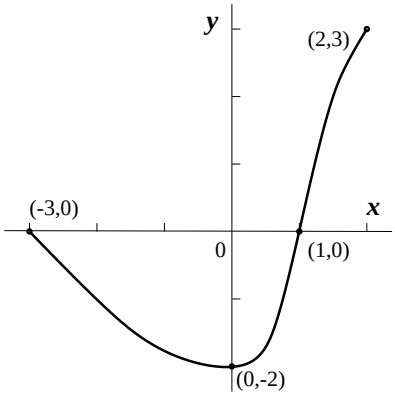
3. A piece of wire 180 inches long is bent into the shape of an isosceles trapezoid whose base angles are $\pi/3$ radians.

a) Suppose x is the length of the lower base of the trapezoid and y is the length of one of the slanted sides. Label the lengths of all sides in terms of x and y and deduce a relationship between x and y.

b) Find a formula for the area A of the trapezoid as a function of the single variable x.

c) Use your calculator to graph the function $A = A(x)$. Are there any upper or lower bounds between which the value of x must lie? If so, decide what happens to A as x approaches those bounds, and explain by drawing pictures of the trapezoid in those cases.

4. To the right is a graph of $y = A(x)$.



a) Find the domain and range of A.

b) If B is defined by $B(x) = A(x) + 1$, sketch the graph of B as well as you can. Find the domain and range of B.

c) If C is defined by $C(x) = A(2x + 3)$, sketch the graph of C as well as you can. Find the domain and range of C.

d) If D is defined by $D(x) = \dfrac{1}{A(x)}$, sketch the graph of D as well as you can. Find the domain and range of D.

One problem will be selected for a writeup to be handed in at the next recitation meeting. Please see Professor Greenfield's Math 151 webpage to learn which problem to hand in.