Homework 4/7

In this assignment you will work problems 13, 15, 27, 29, 21, 5, 6, 8, 35, 37, 39 from Section 4.4. Work them in that order, but follow my instructions:

1. Locate all critical points, including \( y \)-coordinate, and classify each as “local min”, “local max”, or “neither”.

2. Determine where the function is increasing and where it is decreasing. This answer must be written out using interval notation.

3. Determine where the function is concave up and where it is concave down.

4. Locate all inflection points, including \( y \)-coordinates.

5. Sketch an excellent graph of the function. Your graph should be so good that I can read the answers to every one of the first four questions just from your graph. Specifically, your graph must include:
   (a) Correctly labeled axes.
   (b) Exact \( x \)- and \( y \)-coordinates of every critical and inflection point (if possible).
   (c) Correct increasing and decreasing behavior.
   (d) Correct concavity.
   (e) Correct domain.
   (f) Vertical asymptotes, if any
   (g) Axes marked so that I can exactly locate items (b) though (f).

There are additional rules about showing sufficient work.

1. Roots of \( f' \) and \( f'' \) must be located exactly and by algebraic means. You must show all work for the solutions of \( f'(x) = 0 \) and \( f''(x) = 0 \). Calculator approximations of roots or answers obtained from the “solve” command are not acceptable.

2. Information about when \( f' \) and \( f'' \) are positive or negative can be obtained many ways. If you obtain it using a graphing calculator you must recreate in your written answer any and all graphs obtained from your calculator. These graphs must be correctly labeled.