Main Exercises Week 12

MATH 130: Calculus I, Section 4 Your Name (Print): _____

Follow the general guidelines for the Main Exercises assignments (the salmon colored handout). Be sure to **staple** together your pages if you have more than one, and include your **name** at the top. Neatness is appreciated, makes a good first impression, and can earn you a bonus point!!!

This homework is particularly focused on material in Section 4.3, though we discussed in class how this section asks us to recall material from the entire semester!

Due: at the beginning of class on Friday, April 14th

Remember: Your write-up should be **your own**. You may discuss these problems with others, but **you should be alone when you write them up**, using only outlines of any group or Intern discussions. EXPLAIN and SHOW YOUR WORK!!! Final answers will not receive full credit without supportive explanations.

Note: When answering one part of the question, you are welcome to refer to information gained in previous parts.

1. Let $f(x) = \dfrac{x+1}{\sqrt{x^2+1}}$.

(a) Find the domain of f. Use interval notation to state your solution.

(b) Find all x and y intercepts. Label which is which.

(c) Find all horizontal asymptotes. State the asymptotes explicitly.

(d) Find all vertical asymptotes and related information. State the asymptotes explicitly.

(e) Find all intervals on which f is increasing or decreasing.

(f) Find all local extrema, if they exist. (Recall that you need to include x and y values so that you can plot them on your graph.)

(g) Find all intervals on which f is concave up or down. (Note: It is ok if your numbers are complicated! Leave in exact form!)

(h) Find all points of inflection, if they exist. (Recall that you need to include x and y values so that you can plot them on your graph.)

(i) Plot points, sketch asymptotes and sketch the graph of $f(x)$ using the above information. Be sure that you have labeled all key features. Think carefully about the scale before you start drawing.