Homework 9

Practice Exercises from the Textbook & Notes

- §4.5 : 5, 13, 19, 25, 31, 35, 39, 51, 60, 63, 69, 71, 72

- §4.7 : 5, 13, 15, 21, 29, 37, 39, 45, 51, 55, 69, 71

Exercises Due Thursday 24th November at the beginning of class :
For all **curve sketching** exercises determine the following :

a) the domain of the function,

b) the critical points, intervals of increasing/decreasing, local min/max,

c) the intervals where the function is concave up/down, the inflection points

d) the asymptotes (vertical, horizontal, slant)

e) sketch the graph indicating the above points (local min/max, etc.)

For the **optimization questions**, it is usually easier if you :

a) determine the function you will have to maximize/minimize(usually this function will have two variables)

b) find a connection between the two variables, i.e. an equality with the two variables inside

c) substitute in the function so that you get a function with only one variable (which is easier to handle)

d) using derivatives, find the min/max

- §4.5 : 32, 52, 62, 64

- §4.7 : 32, 48, 74

Exercise 1.
Sketch the function $f(x) = \begin{cases} \frac{4}{\pi}\arctan x & \text{if } x \geqslant 1, \\ 2 - x^4 & \text{if } x < 1. \end{cases}$ Moreover, we want to check that the function is continuous at $x = 1$. First explain **in words** what we have to do. Second do the computations that show the continuity at $x = 1$.

Exercise 2. Sketch the function $f(x) = x^{5/3} + \frac{5}{2}x^{2/3}$.

Exercise 3. Sketch the function $f(x) = \begin{cases} e^x & \text{if } x < 0, \\ \frac{x^2+3}{3(x+1)} & \text{if } x \geqslant 0. \end{cases}$ Moreover, verify that $f(x)$ is continuous everywhere.

Exercise 4. Sketch the function $f(x) = \frac{x}{3+x^2}$.

Exercise 5. Do question 4 of the website

Exercise 6. Do question 7 of the website

Exercise 7. Do question 8 of the website

Exercise 8. Do question 10a) of the website

Directions concerning the page setup for assignments : Same as usual.

Remember that there are marks for presentation and explanations, just a bunch of numbers or equations won't give you full mark.