Annotation for the 11^{th} week

Regarding the last example from the first exercise from the last week; you can get a better picture in WA writing something like "(sqrt x + 1) / (x+1) for x from 0 to 1". So, you see how the function graph adheres to the vertical axis.

I will start with differentiating

$$f(x) = xe^{|x^2-x|}.$$

This example illustrates what is a typical issue in the fourth exercise. Then, I will solve the following optimization (maximization) problem.

Exercise. A company can sell 20 pieces of a certain product if it charges 50 \$ per piece. If it charges 60 \$, it sells 10 pieces. Moreover, the cost of producing q (=quantity) pieces is $C(q) = 200 + 8q$. What is the maximum profit that the company can achieve?

After this, you will have circa one hour to practise examples from the second and third exercise (1st and 4th can be ignored).

Next, I will demonstrate how to use L'Hpital's rule to solve the following limits

$$\lim_{x\to 0} \frac{e^{x^2} - \cos 4x}{x^2} \quad \text{and} \quad \lim_{x\to\infty} \frac{\log(x^5 - \arctan(x^2))}{\log(x^3 - x^2 + 1)}.$$

Then, I will show why it cannot be used to solve

$$\lim_{x\to-\infty} \frac{x + \sin x}{x}.$$

In the remaining time, you can either practice differentiating or L'Hpital's rule.

Examples to practise:

(Derivatives) 2b, e, h, l; 3c, d, e, i, o.

(L'Hpital's rule) 5c, h, l, n, q, u.