Scored homework, winter term 2023/24

Instruction:

Work out the solution by hand on paper, write your name legibly on the top of the introductory sheet. For each problem, write its number. Take a photo of the resulting sheet(s), check that everything is legible on the photo (write clearly and with a bold pen; squared papers etc. are not suitable).

If you have solutions on multiple sheets, merge them into one file and converge everything in **PDF** format, use for example https://jpg2pdf.com/ or another similar application. Check that the file has not more than 20MB, so the quota is set in insis and according to our experience it is sufficient.

Upload the resulting file in the submission form in insis ("Coursework submissions"). If there are technical problems with submitting this way, please email me.

The submission deadline is Friday, November 10, 2023, 22:00.

Don't leave submissions to the last minute. If for any reason you do not submit on time, I will not accept the assignment and there will be no way to make up for it. Therefore, make sure in time that you have the task completed, legibly photographed, converted into a single PDF file and that it does not exceed 20MB, so that you can submit it by the deadline.

Mathematics 55F750, WT 23/24 Scored HW

1. (1 point) For the function

$$f(x) = \frac{\sqrt{4+2x}}{x^2-25}$$

determine its domain D_f, intersections with axes and intervals where the function is positive/negative.

2. (1 point) Compute the limit

$$\lim_{n\to\infty} \frac{2\cdot 3^{n+1} - 3\cdot 2^{n-1}}{2^{n+1} + 6\cdot 3^{n-1}}$$

3. (1 point) For the function

$$f(x) = \frac{4x-1}{5x-x^2}$$

determine its domain D_f and limits at all its extreme points.

4. (1 point) Find the derivatives of given functions (just write the derivatives, do not determine D_f or $D_{f'}$). Simplify the resulting expressions as much as possible.

(a) $f(x) = e^{3x^2-\frac{7}{x}}$, **(b)** $g(x) = \frac{\sqrt{4-2x}}{3x^2-x}$