Grading and remarks for Lab 7

1 For each question I awarded 1 point for the right domain, 0.5 points for approaching the derivative with the right method (e.g. chain rule) and 1 full point for the correct computation of the derivative.

Review the chain rule. In $(f(g(x)))' = f'(g(x))g'(x)$ you should evaluate the derivative of $f(x)$ at $g(x)$, you should not multiply it by $g(x)$.

Make sure that when you write a domain you put *leq* and *geq* when the extrema are included.

Review how to calculate the domain of a composition of functions. If you have $f(g(x))$, the domain of $g(x)$ gives a first restriction. Then, you should compare the range of $g(x)$ with the domain of $f(x)$ and understand for which values of x $g(x)$ falls in the domain of $f(x)$.

Remember that $\tan^{-1}(x)$ denotes the inverse function of $\tan(x)$, not $\frac{1}{\tan(x)}$.

2 For (a) I gave 0.5 to people who tried to use something similar to $\lim_{x\to 0} \frac{\sin(x)}{x} = 1$ but incorrect. I awarded 1 point to people who used $\lim_{x\to 0} \frac{\sin(x)}{x} = 1$. I gave 2 points for the complete correct answer. I took 0.5 points away to people who omitted the symbol lim during computations. Indeed $\lim_{x\to 0} \frac{\sin(x)}{x} = 1$ but $\frac{\sin(x)}{x}$ is not 1! As remark, review the definition of derivative at one point. Indeed $\lim_{x\to 0} \frac{\sin(x)}{x} = \cos'(0)$, it is not $\cos(x)$.

For (b) I awarded 1 point for the right computation of the special case. I awarded 1 point for setting up the equation $x = f^{-1}(f(x))$ and I awarded a further point for using it correctly with chain rule to prove the formula. As remarks, notice that $f^{-1}(x)$ denotes the inverse function, not $\frac{1}{f(x)}$, which should be written as $(f(x))^{-1}$. Also, if you are asked to prove a formula, checking that it works in some particular cases does not provide an answer.

For (c), I awarded 2 points for a full correct answer (there were more ways to do it). I awarded 1 point for recognizing the limit given as the derivative of $\ln(x)$ at 1. Notice that you cannot assume what you have to show holds true for proving it. Also, if you take the limit of a ratio, you cannot apply both to numerator and denominator the same function and hope the limit will not change.

For (d) I awarded 1 point for the domain, 1 point for finding correctly the derivative and 1 point for finding the tangent line. Be careful when you do an exercise: remember to do all the points asked (such as to determine the domain). Also, remember that any number multiplied by 0 is 0, not 1!!!

3 For (a) I awarded 1 point for the correct answer and 0 otherwise. For (b), (c) and (d) I awarded 1 point for choosing the right equation to use and understand what the given data meant, while I awarded 2 points for using them correctly to find the answer. In part (d) I awarded 1.5 if the numerical value was correct but nothing was said about the current being decreasing.