

## Homeworks for 5<sup>th</sup> week

1. Find the intervals where the function is increasing/decreasing. Determine local extrema. (Don't forget the domains!)

(a)  $f(x) = \operatorname{arctg}(x - 1)^2$

(b)  $f(x) = \frac{2x}{1+x^2}$

2. Find the intervals where the function is increasing/decreasing. Determine local extrema. (Don't forget the domains!)

(a)  $f(x) = x^2 - \ln x^2$

(b)  $f(x) = x^3 \cdot e^{-x}$

3. Find the intervals where the function is increasing/decreasing. Determine local extrema. (Don't forget the domains!)

(a)  $f(x) = x \cdot e^{\frac{-1}{x}}$

(b)  $f(x) = \frac{1+\ln x}{x}$

4. Find the intervals where the function is increasing/decreasing. Determine local extrema. (Don't forget the domains!)

(a)  $f(x) = \frac{\ln x}{x^2}$

(b)  $f(x) = x^2 \cdot e^{\frac{1}{x}}$

5. Find the tangent of the graph of function  $f$  in a given point  $x_0$ .

(a)  $f(x) = \frac{1}{1+x^2}, x_0 = 1$

(b)  $f(x) = e^{-x^2}, x_0 = 1$

6. Find the constant  $C \in \mathbb{R}$ , such that the function  $f$  would be continuous.

$$f(x) = \begin{cases} -\operatorname{arctg}x + C, & x \leq 0, \\ e^{x+1}, & x > 0. \end{cases}$$