# - MATH153 - Homework 9

due date: May 17, 2019 at 12:30

1. Let $f(x) = \dfrac{1}{\ln(x)}$.
   (a) Find domain of $f$.
   (b) Find x-intercept and y-intercept, whenever they exist.
   (c) Find the critical points (if there is any) and intervals of increase and decrease.
   (d) Find the inflection points (if there is any) and intervals of concave up and concave down.
   (e) Sketch the graph.
2. Can we say the absolute extreme values exists for the following functions? Why? (No need to find values, justify your answer by using Theorems)
   (a) Let $f(x) = 2xe^{x^2}$ be a function on $[0, 5]$.
   (b) Let $f(x) = 2xe^{x^2}$ be a function on $\mathbf{R}$.
3. Let $f(x) = xe^{-x^2}$ be a function on $\mathbf{R}$
   (a) Find the local extreme values.
   (b) Find the absolute extreme values, if they exist.