Note. No assignment shall be receive in the afternoon or later.

Comment for the student. The purpose of the assignment is for you to practice how to write mathematics and no so much on the content of the course. Write the assignment as if you were explaining it for one of your schoolmates. In particular, use lay language (or common use language) and do not make an essay out of this, a well-done exercise should have four to five lines and maybe one drawing (for instance, a graph). An assignment where no explanation is provided of what is going shall receive a mark of zero, even if you draw, wrote formulae or equations that make sense.

Remark (1.1) I have use the notation $x \mapsto f(x)$ to mean “$x$ is mapped to $f(x)$.” I prefer this because $f(x)$ is the $y$-value of the function $f$ at $x$ and we think of $f$ as a “machine” that given some $x$ in its domain, it transforms $x$ into an outcome called $f(x)$. You can refer to functions as $f(x)$ if you prefer.

Exercise (1.2) We remark that the function $x \mapsto \sqrt{x}$ is defined only when $x \geq 0$ and so, its limit at zero only make sense from the right. Consider the function $f$ given as $x \mapsto \sin(x) \sqrt{x}$ and notice that $f$ has for domain the set $\{x \in \mathbb{R} \mid x > 0\}$. Either find an $L \in \mathbb{R}$ such that $\lim_{x \to 0^+} \frac{\sin(x)}{\sqrt{x}} = L$ or justify that the limit is $\infty$ (or $-\infty$) or justify that is does not exist and is not of the “$y$-value tends to infinity”-type.

Hint: when I motivated the notion of limit, I used www.desmos.com to graph the function $x \mapsto \frac{\sin(x)}{x}$ for $x \neq 0$ and we noticed that this function has limit one at zero.