# Individual 4

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Introduction to Proof and Problem Solving

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**Problem 12.** (1) Consider the statement

$$p \equiv \{\forall M \in \mathbb{R}, \exists K \in \mathbb{R} \text{ s.t. } \forall x > K, f(x) > M\}.$$

(a) Write $\neg p$.

(b) Consider the function $f$ from $\mathbb{R}$ into $\mathbb{R}$ defined by

$$f(x) = \begin{cases} \frac{1}{x} & x \neq 0 \\ 0 & x = 0 \end{cases}.$$

Does $f$ satisfy $p$ or $\neg p$? Prove your answer.

*Solution.* (a) The negation of $p$ is

$$\neg p \equiv \{\exists M \in \mathbb{R} \text{ such that } \forall K \in \mathbb{R}, \exists x < K \text{ such that } f(x) \leq M\}$$

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*Proof.* We will do something...

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While working on this proof, I received no external assistance aside from advice from Professor Mehmetaj.