

MTHT 430 Analysis for Teachers
Problem Set 12

Do the following Problems from Spivak's *Calculus*.

Chapter 7: 16, 17

1) Suppose $f : [a, b] \rightarrow \mathbb{R}$ is continuous and $f(x) > 0$ for all $x \in [a, b]$. Let $g(x) = \frac{1}{f(x)}$. Prove that there are $r, s \in \mathbb{R}$ with $r, s > 0$ such that $r \leq g(x) \leq s$ for all $x \in [a, b]$.

2) Suppose $f : [0, 1] \rightarrow \mathbb{R}$ and $g : [0, 1] \rightarrow \mathbb{R}$ are continuous and $f(x) > g(x)$ for all $x \in [0, 1]$. Prove that there is $a > 0$ such that $f(x) \geq g(x) + a$ for all $x \in [0, 1]$.