UM 101: QUIZ 9

Jan. 12, 2023

Duration. 15 minutes

Maximum score. 10 points

Name.

Tutorial section.

Problem. Let $f : \mathbb{R} \to \mathbb{R}$ and $g : \mathbb{R} \to \mathbb{R}$ be continuous functions such that

$$\int_0^x f(t)dt = x + \int_0^x g(t)dt \quad \forall x \in \mathbb{R}.$$

Prove that if f is differentiable on $\mathbb{R}$, then so is g, and $f'(x) = g'(x)$ for all $x \in \mathbb{R}$. Please provide a **rigorous** argument. If you use any theorems stated in class, you **must justify** why they apply to your situation.