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Name:

Analysis II — Quiz 2
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Q2.1. Integration by Substitution.

Use the fundamental theorems of calculus and the chain rule to show the following:

Let $f \in \mathcal{C}([a, b])$ and assume $g : [c, d] \longrightarrow [a, b]$ is continuous and differentiable on (c, d) with $g(c) = a$ and $g(d) = b$. Then

$$\int_a^b f(y) \, dx = \int_c^d f(g(x)) g'(x) \, dx.$$

Q2.2. Find $\int_0^1 x^2 \sin(\frac{\pi}{2}x^3)dx$.