Final Project Team 6

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Problem

Let f be a three times differentiable function (defined on $\mathbb{R}$ and real-valued) such that f has at least five distinct real zeros. Prove that $f+6f'+12f''+8f'''$ has at least two distinct real zeros.

Polynomial Function

A polynomial is generally represented as $P(x)$. The highest power of the variable of $P(x)$ is known as its degree. Degree of a polynomial function is very important as it tells us about the behaviour of the function $P(x)$ when x becomes very large, and also helps us to know the number of roots that we can have in a function. The domain of a polynomial function is entire real numbers $\mathbb{R}$.

Rolle's Thorem

Let f be a continuous function on $[a,b]$ and differentiable on $]a,b[$ such that $f(a)=f(b)$. Then there exists $c \in]a,b[$ such that $f'(c)=0$.

Hint

Use $g : x \to e^{\alpha x}$

Rolle's Theorem

$$\int_a^b f(x)dx$$