

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} .

So in all cases f admits a local extremum at a point c of $]a, b[$ and is differentiable on $]a, b[$, hence, according to the proposition 22, $f'(c) = 0$.

Hint

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