

Today's II Scian Approach

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For II SER's | ISI | CML

$$\text{Let } P(x) = a_n x^{2n} + a_{n-1} x^{2n-2} + \dots + a_2 x^4 + a_1 x^2 + a_0$$

is a polynomial in a real variable x with

$0 < a_0 < a_1 < a_2 < \dots < a_n$. Then the

set $A := \{a \in \mathbb{R} : P(x) \text{ has maxima or minima at } x=a\}$.

is empty. (True/False).

!:-

How to

THINK

Recall some basic facts :-

• At $x=a$, $f(x)$ has local maximum or local minimum then $f'(a) = 0$. (+ must be differ. on \mathbb{R})
(How???)

• Here $P'(x) = 2n a_n x^{2n-1} + \dots + 4a_2 x^3 + 2a_1 x$

$$\text{i.e. } P'(x) = 2x [a_1 + 2a_2 x^2 + \dots + n a_n x^{2n-2}]$$

• observe that

$$P'(x) > 0 \quad \forall x > 0 \quad (\text{Justify})$$

$$P'(x) < 0 \quad \forall x < 0$$

• Thus $P'(x)$ changes sign from (-ve) to (+ve) at $x=0$

• $P(x)$ attains minimum at $x=0$

$$A = \{0\} \neq \emptyset$$

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