$S = \{x : (x-a)(x-b)(x-c)(x-d) < 0\}$

I showed in HW that $\begin{matrix} x > a \\ x < d \end{matrix} \Rightarrow a < x < d$

you asked, what about $a < x < b$

I stated it's irrelevant b/c it's not in the set, so it does not matter.

It can not exist by definition.

Let $a < x < b$

$$\left.\begin{aligned} &\Rightarrow (x-a) = \ominus \\ &\Rightarrow (x-b) = \oplus \\ &\Rightarrow (x-c) = \oplus \\ &\Rightarrow (x-d) = \oplus \end{aligned}\right\}$$ so it is < 0, then it does not satisfy the definition of S.

$x \neq a$, $x \neq b$, $x \neq c$, $x \neq d$ are also true but it does not matter b/c it's not in set by definition.

if $x = a$, then $(x-a)(x-b)(x-c)(x-d) = 0$

so $x \neq a$.

S only exists between $a < x < d$

so even if $a < x < b$, it's irrelevant, b/c it exists outside our set, S.

So I understand you want all cases, but if $a < x < d$, then it satisfies the def of inf/sup.

as long as $a < x < d$ → REGARDLESS OF THE VALUE OF 'x'

(?) → what am I missing?

I showed the set S is bounded above

I showed the set is bounded below.

The exact values of x are not relevant to proving that.

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