تمرین

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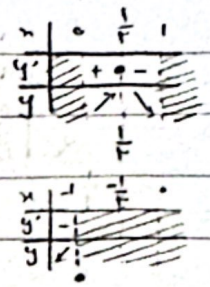
$f(x)=\sqrt{x(1-|x|)}$ m,n ← نقاط بحرانی k نقاط عطف $k+m+n=?$

سپس

$f(x)$ $\begin{cases} x\to 0^+ \Rightarrow \sqrt{x(1-x)}=\sqrt{x-x^2} \to f'(x)=\dfrac{1-2x}{2\sqrt{x-x^2}} \\ x\to 0^- \Rightarrow \sqrt{x(1+x)}=\sqrt{x+x^2} \to f'(x)=\dfrac{1+2x}{2\sqrt{x+x^2}} \end{cases}$ ←



D_f : $x(1-|x|)\geq 0$ ← $\dfrac{-1 \quad 0 \quad 1}{+\ -\ +\ -}$ ← $0\leq x\leq 1$

$-1\leq x\leq 0$

نقاط بحرانی : $\{\frac{1}{4}, 0, 1, -1\} \Rightarrow k=4$ ②

سپس Max : $\{\frac{1}{4}\}$ $m+n+k=5$ ✓

سپس Min : ندارد

$f(x)=\sqrt{x}+\sqrt{a-2x}$ ← حداقل بیشترین مقدار $=\sqrt{12}$ $[a]=?$ D_f : $x\geq 0$

$a\geq 0$ بیشترین مقدار $a-2x\geq 0$

$\frac{a}{2}\geq x$ ①

$0\leq x\leq \frac{a}{2}$

$f'(x)=\dfrac{1}{2\sqrt{x}}-\dfrac{1}{\sqrt{a-2x}}=\dfrac{\sqrt{a-2x}-2\sqrt{x}}{2\sqrt{x}\sqrt{a-2x}}$ $\sqrt{a-2x}=2\sqrt{x}$

$a-2x=4x$

$a=6x \to x=\frac{a}{6}$

$\frac{a}{2}$

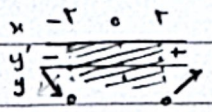
$f(x) = \frac{x^2}{x^2-1}|x^2-4|$ ← تعداد نقاط اکسترم

$x<-2$ یا $x>2$ → $\frac{x^2}{x^2-1}(x^2-4) = \frac{x^4-4x^2}{x^2-1}$ → $f'(x) = \frac{2x^5-4x^3+8x}{(x^2-1)^2} = \frac{x(2x^4-4x^2+8)}{(x^2-1)^2}$ ①

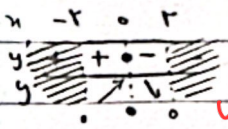
$-2<x<2$ → $\frac{x^2}{x^2-1}(-x^2+4) = \frac{-x^4+4x^2}{x^2-1}$ → $f'(x) = \frac{-2x^5+4x^3-8x}{(x^2-1)^2} = \frac{-x(2x^4-4x^2+8)}{(x^2-1)^2}$ ②

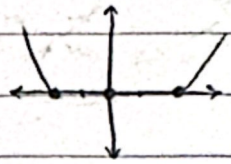
علامت عبارت داخل رادیکال: $2x^4-4x^2+8$ $\xrightarrow{x^2=t}$ $2t^2-4t+8$ → $\Delta<0$ → $a>0$ → عبارت همواره مثبت

①



②





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