Lec 10/24

Monday, October 24, 2016 9:13 AM

Review Problems

something similar will be on in-class midterm!

1) $f(x) = \frac{1}{x^2+2x-3}$. Graph f

3) In Class

Remark: not true for closed interval

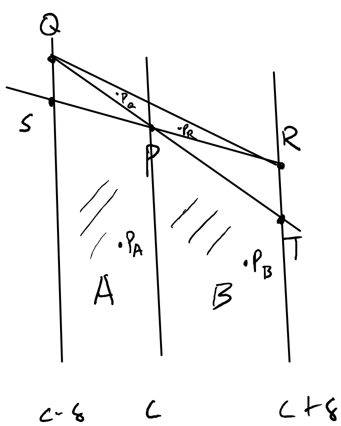
suppose $c \in (a,b)$. Then for some $\delta > 0$, $c \pm \delta \in (a,b)$.

Let $P = f(c)$, $Q = f(c-\delta)$, $R = f(c+\delta)$

We can have $f(c-\delta) > f(c) > f(c+\delta)$

or $f(c-\delta) < f(c) < f(c+\delta)$

or $f(c) < f(c-\delta)$, $f(c) < f(c+\delta)$.



Claim: graph of f must lie inside the triangles ΔPQS and ΔPRT:

1) graph must lie below $\overline{QR}$ (convexity)
2) " " below $\overline{QP}$ (P_a above $\overline{QP}$)
3) " " below $\overline{PR}$ (P_R above $\overline{PR}$)
4) graph cannot be in A (P would be above $\overline{RP_A}$)
5) cannot be in B (P would be above $\overline{QP_B}$)

So let ψ be the function whose graph is $\overline{PQ} \cup \overline{PR}$

" φ " " $\overline{PS} \cup \overline{PT}$

Then $\varphi(x) \leq f(x) \leq \psi(x) \quad \forall x \in [c-\delta, c+\delta]$

so by squeeze thm, $\lim_{x \to c} f(x) = f(c)$. ●

Note: for #5, $\dfrac{\partial y}{\partial x} = - \dfrac{\partial f / \partial x}{\partial f / \partial y}$

$f(x,y) = (xy - 1)(2 \ 2 + x^2 - 3) = 0$

$=$ union of graphs of $xy = 0$

and $2y^2 + x^2 - 3 = 0$

and $(1,1)$ is an intersection point.