Welcome to Math 128A!

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Office Hours: TBA (will send email)

<course structure>
- HW (due Weekly on Wednesday)
- Quizzes every 2 weeks (first on Sept 11)
- Programming assignment
- Midterm
- Final

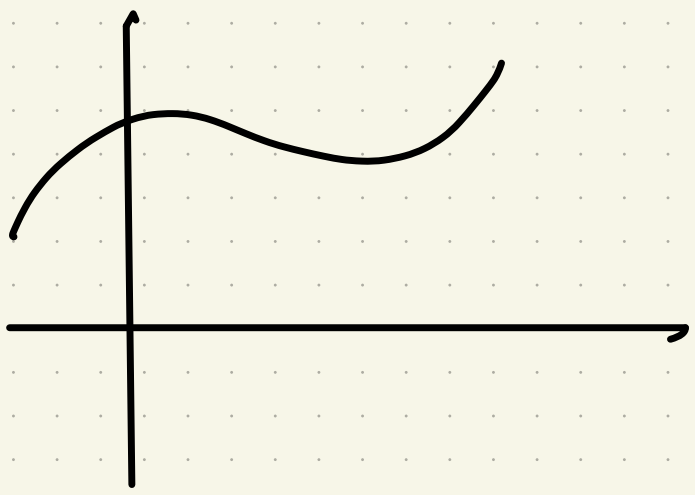
Quizzes must be taken <u>in section in person</u>

Calculus review

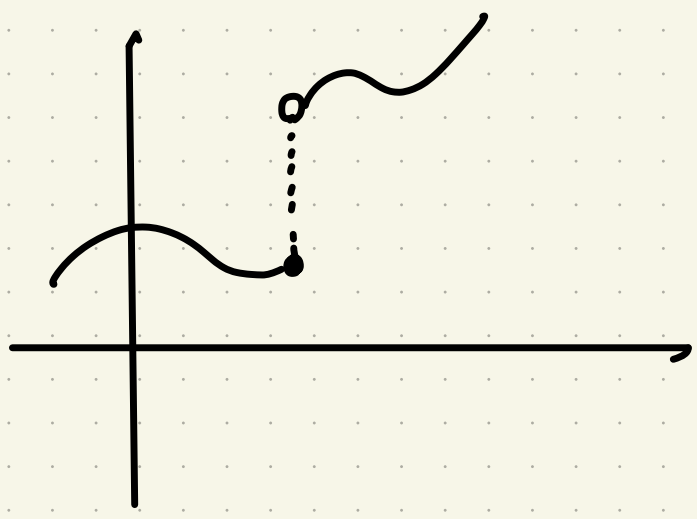
⁂ please review if unfamiliar

1) continuity ... can draw in one penstroke

(don't need ε/δ definition in this class)

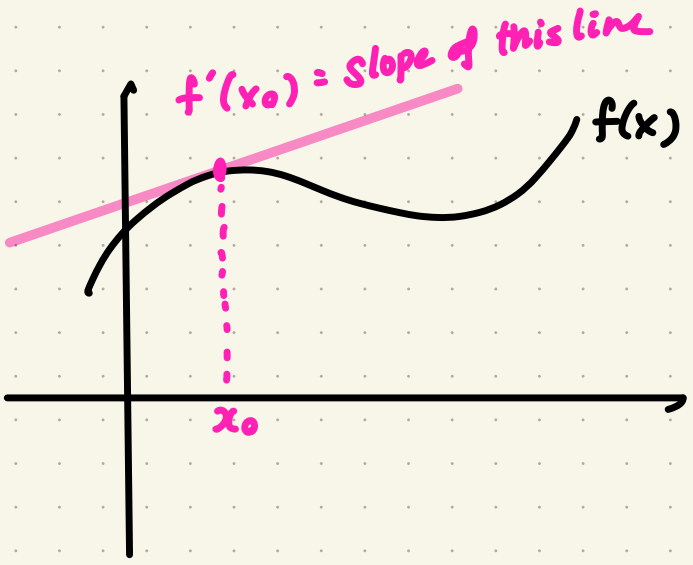


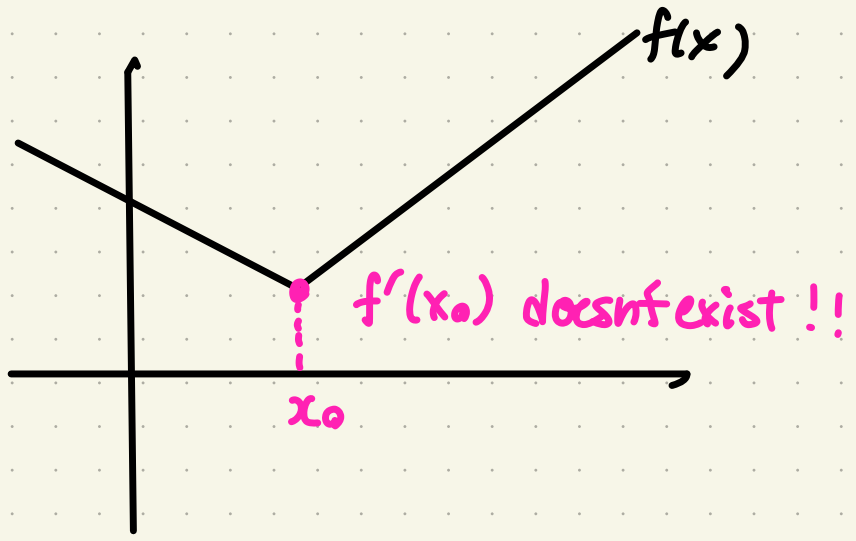
Yes!! ✓



No!! ✗

2) differentiable ... gives slope of function





3) Taylor series ... assume f is infinitely differentiable at some pt x_0

ex $\sin(x)$, $\cos(x)$, polynomials etc...

Taylor exp of $f(x)$ @ x_0

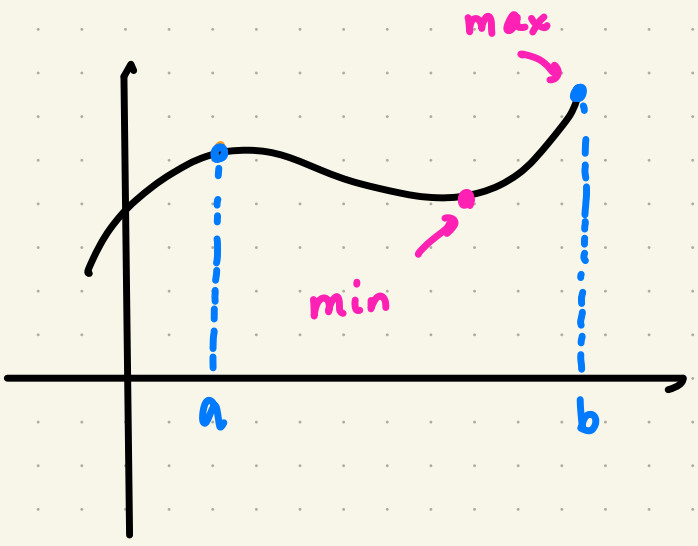
-X: important!

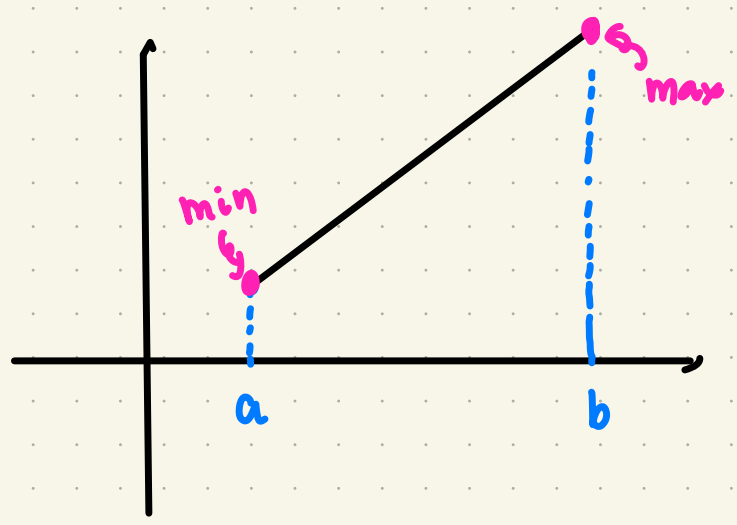
$$f(x_0) + f'(x_0)(x-x_0) + \frac{f''(x_0)}{2!}(x-x_0)^2 + \sum_{k=3}^{\infty} \frac{f^{(k)}(x_0)}{k!}(x-x_0)^k$$

4) Extreme value theorem

$x \in [a,b]$

If $f(x)$ is continous on $[a,b]$, f attains a max/min on $[a,b]$.





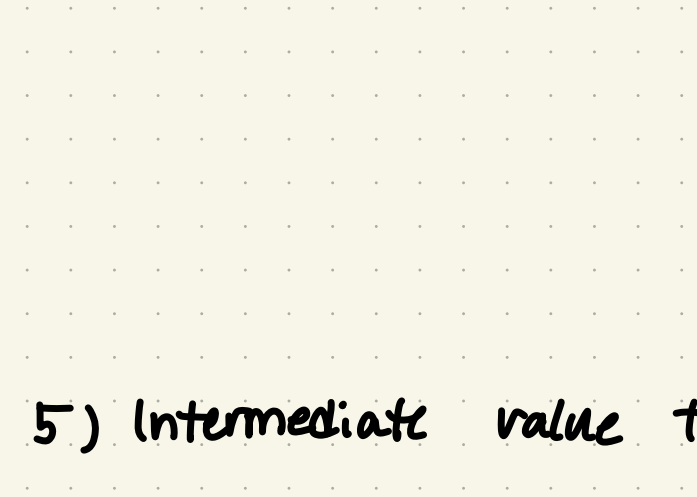
5) Intermediate value theorem

$x \in [a,b]$

If $f(x)$ is continous on $[a,b]$, f attains

every value between $\min_{x \in [a,b]} f(x) \leq c \leq \max_{x \in [a,b]} f(x)$

※ Pretty obvious if you look at a picture



→ If f continuous on $x \in [a,b]$,

for any $\min_{x \in [a,b]} f(x) \leq c \leq \max_{x \in [a,b]} f(x)$,

there exists $d \in [a,b)$ st

$f(d) = c$.

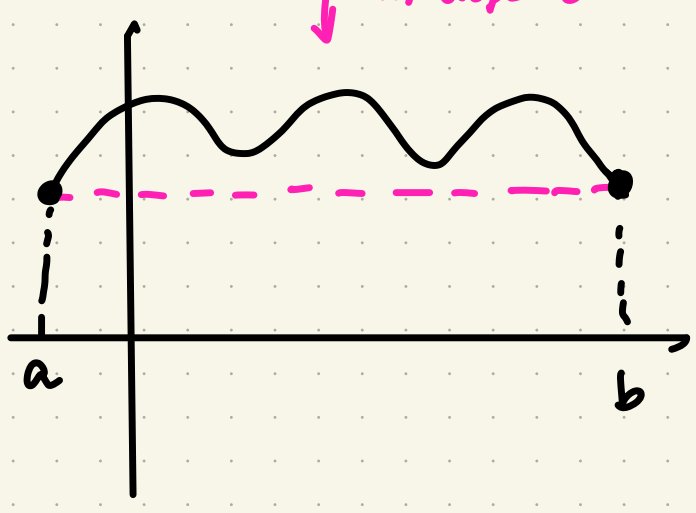
6) Mean value theorem

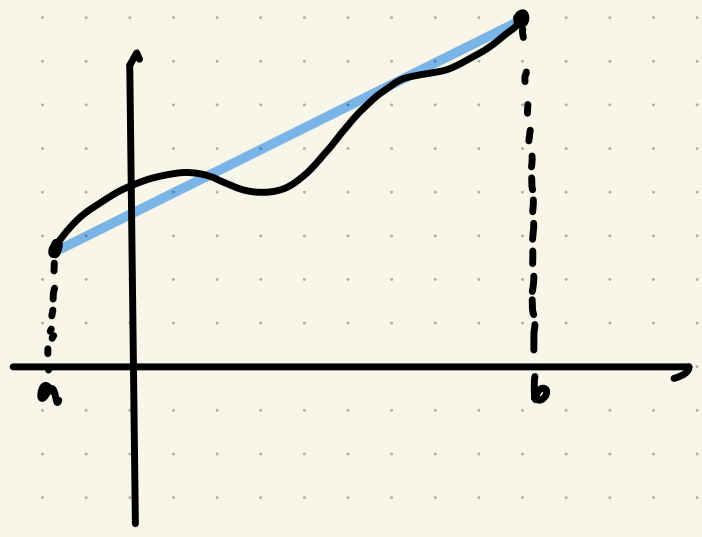
✳ important!

For f differentiable on $[a,b]$, there exists some pt $d \in [a,b]$ st

$$\frac{f(b)-f(a)}{b-a} = f'(d)$$

must be some pt in between a and b
w/ slope = 0





must be some pt in between a and b
where slope equals slope of —

where the blue line = line between (a, f(a)) and (b, f(b))