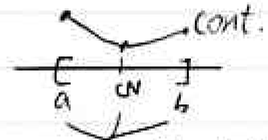
(4.1) Critical #s (CNs: #s in Dom(f) where $f'=0$ or DNE)
$\xrightarrow{?}$ L. Max/Min

EVT



✓ for A. Max/Min
∃ (there exist)

If f cont. on closed interval, we're guaranteed what?

(4.2) Rolle
MVT

f cont. on [a,b], diff'e on (a,b), f(a)=f(b) ⇒ ∃c in (a,b): $f'(c)=0$
⇒ ∃c in (a,b): $f'(c)=\frac{f(b)-f(a)}{b-a}$

(4.3) f' ⇒ Find CNs.
Where f ↗, ↘
1st DT to classify pts. at CNs. L. Min., L. Max., Neither
(Plug into f to get y-coords.)

2nd DT: Only f'–f'' bridge: You can use f'' to tell you about pts. at critical #s *assoc. w/ f'. Plug in CNs into f'' for 2nd DT. o.w., f' issue ⇒ f'/f''

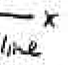
(4.4) f'' ⇒ Find PINs.
Where f graph (CU), (CD). (IP)s: if f cont., concavity changes
(Plug into f to get y-coord.)
2nd DT to classify pts. at CNs (faster than 1st DT?)
Need $f'=0$. f'' ⊕ ∪(CU) L. Min., f'' ⊖ ∩(CD) L. Max. else no info

(4.5) Graphing

(4.6) Optimization (handout)

(4.7) Rectilinear Motion $\underrightarrow{\;s\;}_s$

(4.8) Newton's Method
Approx. sol'n of $f(x)=0$.



x_1 = seed
$x_{n+1}=x_n-\frac{f(x_n)}{f'(x_n)}$ ← ≠0