4.3 Connecting f' and f'' with the graph of f

A QUICK SUMMARY OF SECTION 4.3

POINTS OF INFLECTION
Second Derivative

→ $f'' = 0$ ... OR ... f'' undefined

→ f'' changes signs at that point

If there is NO sign change, then there is NO inflection point!

or the slope of f' changes signs

CONCAVITY
Second Derivative

→ Concave DOWN → $f'' < 0$

or f' is decreasing on the given interval.

→ Concave UP → $f'' > 0$

or f' is increasing on the given interval.

EXTREMA
First Derivative

→ $f' = 0$ ... OR ... f' undefined
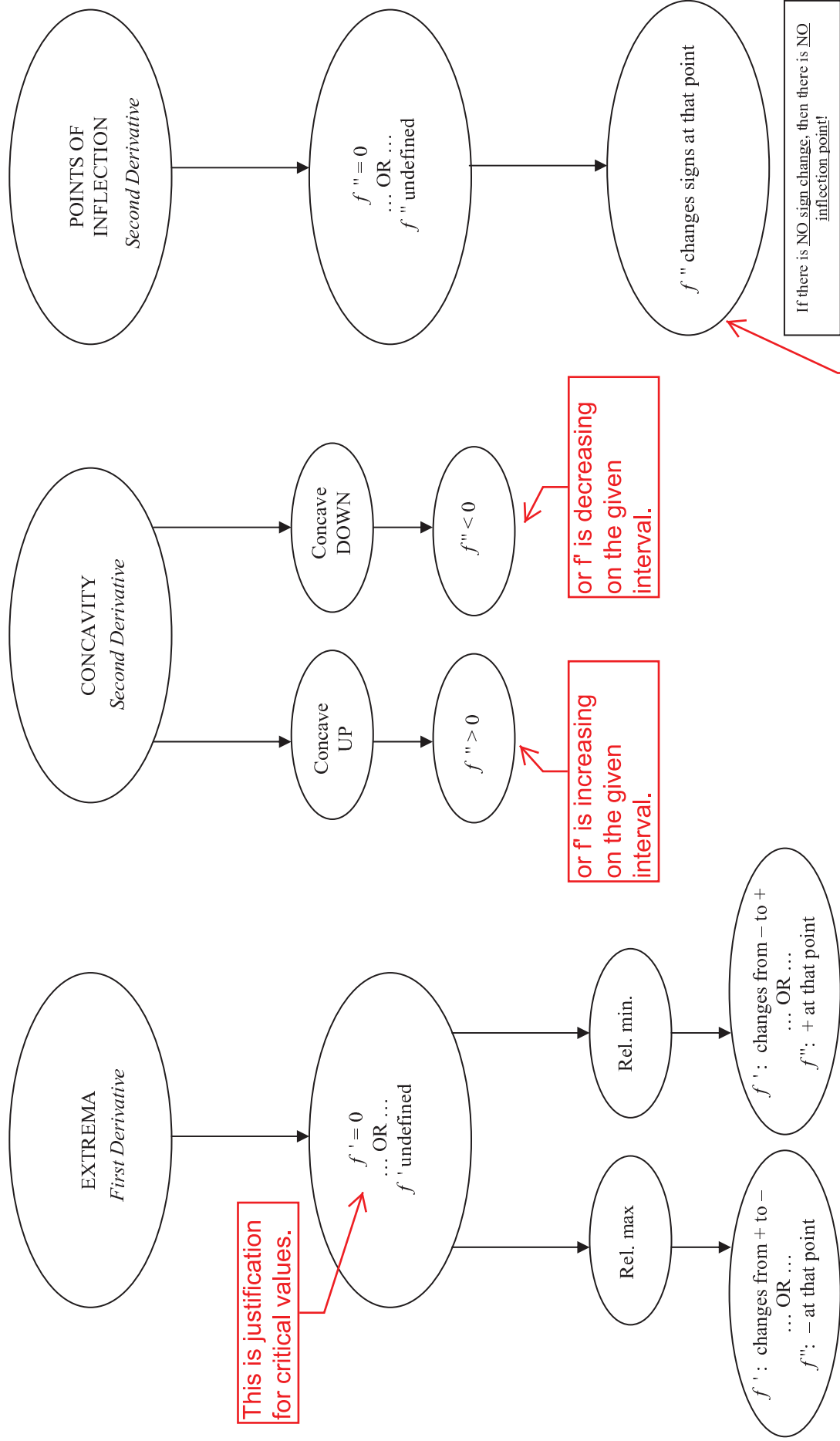
This is justification for critical values.

→ Rel. min. → f': changes from $-$ to $+$ ... OR ... f'': $+$ at that point

→ Rel. max → f': changes from $+$ to $-$ ... OR ... f'': $-$ at that point

Important ♫ : For **closed** intervals check the endpoints to find absolute extrema

To justify increasing: f' > 0
To justify decreasing: f' < 0