The mean Value and Rolle's theorem

Mean value theorem: $f'(c) = \frac{f(b)-f(a)}{b-a}$, must be differentiable, is defined and continuous.

Rolle's theorem/ critical numbers: $f(b) = f(a)$, $f'(c) = 0$, is defined, continuous, differentiable on **(a, b)** and has at least one **c**.

Fermat's theorem: f'(x) = 0 or f'(x) = does not exist .This is **critical numbers** or **critical values.**

💡 **only critical points and endpoints can be absolute maxima or minima !**

At the maximum and minimum the tangent lines are zero, the slope = 0

😋 Therefore f'(c) = 0 , this has a max and a minimum

If it's not zero , it does exist. It is ***NOT*** a maximum or minimum

$f''(x) > 0 \; -> \; local\, min$

$f''(x) < 0 \; -> \; local\, maximum$