# Section 2.9 The Mean Value Theorem

Rolle's Theorem:("What goes up must come down theorem") Suppose that
- f is continuous on the closed interval $[a, b]$
- f is differentiable on the open interval (a, b)
- $f(a) = f(b)$

Then there is "c" in the open interval (a, b) for which $f'(c) = 0$

Geometrically Rolle's Theorem means; if the function values are the same at the end points of a closed interval for a differentiable and continuous f, then there is a point c at which the tangent line is horizontal. Check out the picture below

Out[58]=

a   c   b
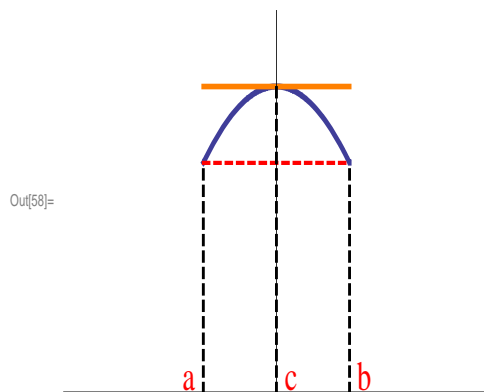
Rolle's Theorem is an "existential" theorem it just says there is such a "c", it doesn't say what it is. Also it does not claim "c" to be unique. As you might observe from the graphical example below there could be two such "c"'s (like c and c' in the graph below)in an interval or even more.