To understand the preceding statement fully, observe that the last fraction is the slope m of a line joining the endpoints $(a, f(a))$ and $(b, f(b))$. Thus, by the mean value theorem, there must be a point $(c, f(c))$ with $a < c < b$ at which the slope of the tangent line will be equal to m. Examine Figure 5.3.2. Note that Rolle's theorem is a special case of the mean value theorem.

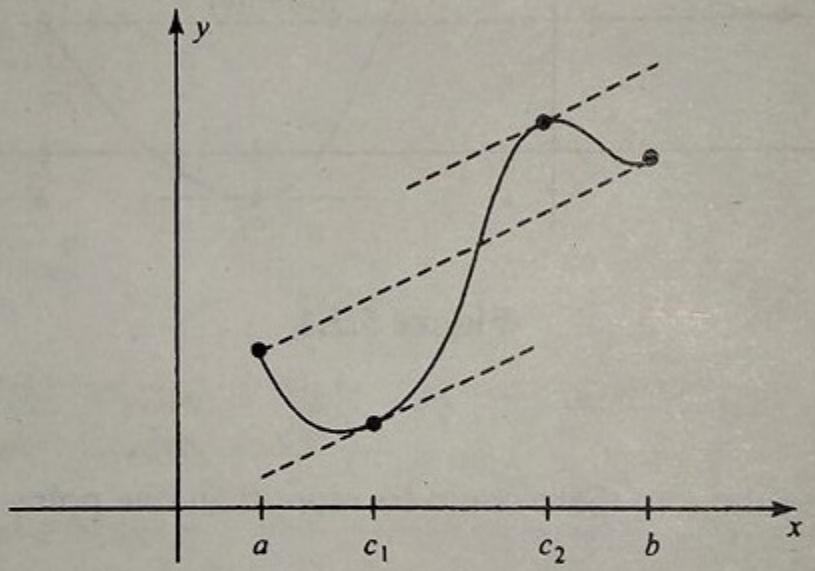

Figure 5.3.2

Remark 5.3.4. Observe also that the conclusion of the mean value theorem could be restated as follows. There exists $\theta \in (0, 1)$ such that

$$f(x + h) - f(x) = hf'(x + \theta h),$$

where $x = a$ and $x + h = b$. □