extended mean-value theorem

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Related topic	MeanValueTheorem

Let $f : [a, b] \to \mathbb{R}$ and $g : [a, b] \to \mathbb{R}$ be continuous on $[a, b]$ and differentiable on (a, b). Then there exists some number $\xi \in (a, b)$ satisfying:

$$(f(b) - f(a))g'(\xi) = (g(b) - g(a))f'(\xi).$$

If g is linear this becomes the usual mean-value theorem.